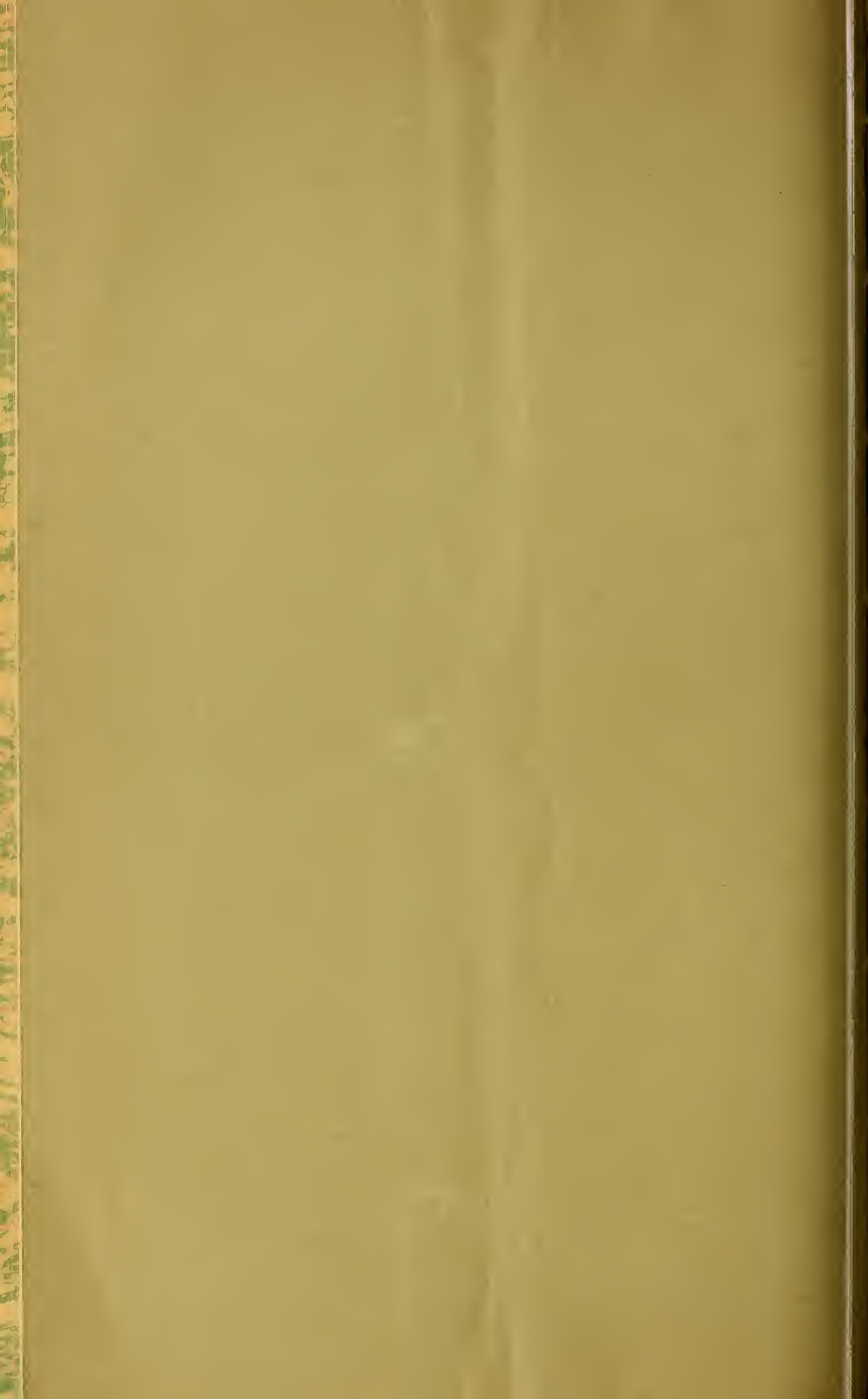


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MISCELLANEOUS PUBLICATION No. 118

WASHINGTON, D. C.

OCTOBER, 1931

THE INFLUENCE OF WEATHER
ON CROPS : 1900-1930

A Selected and Annotated Bibliography

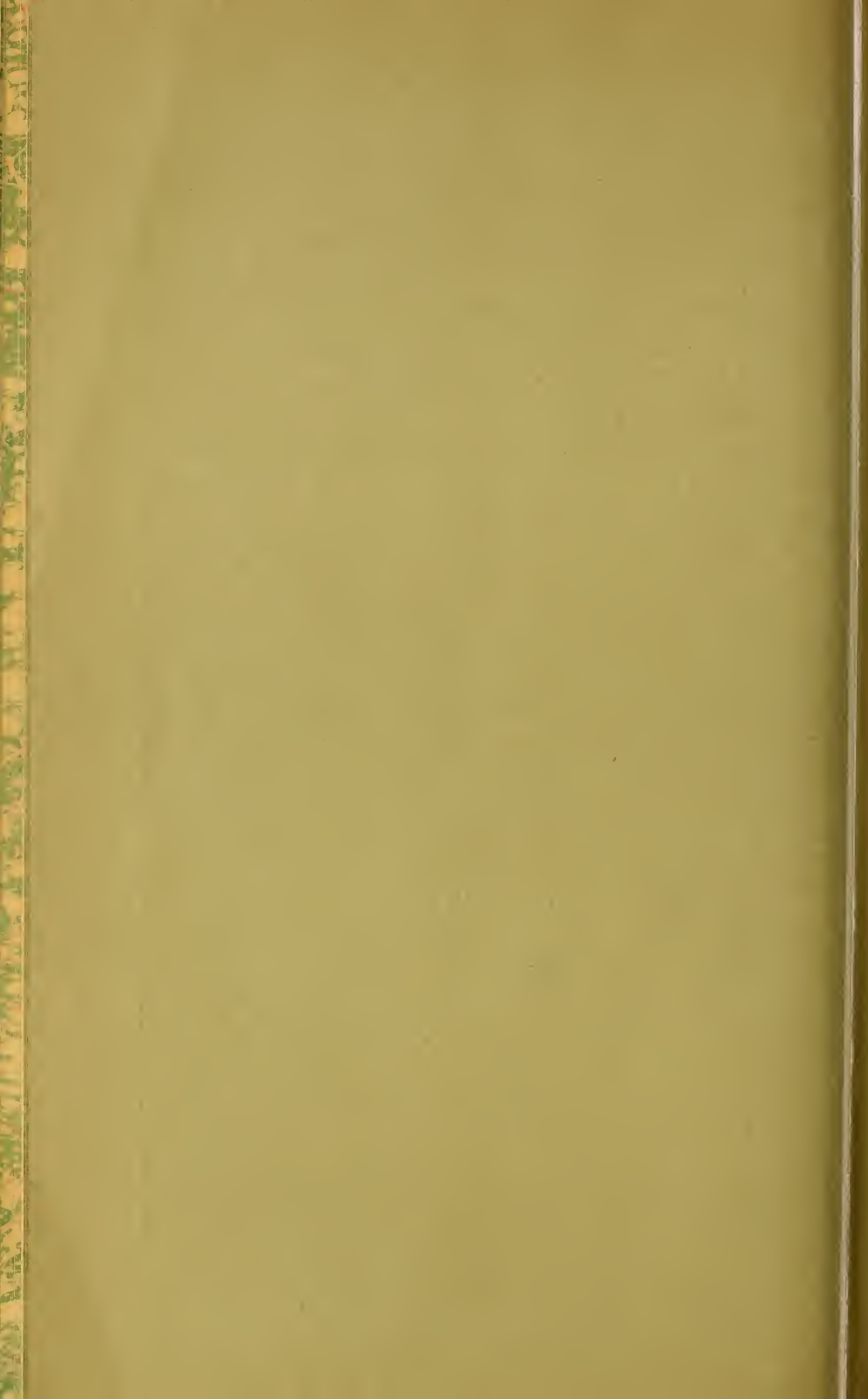
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Under the Direction of MARY G. LACY, Librarian

Bureau of Agricultural Economics





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THE INFLUENCE OF WEATHER ON CROPS: 1900-1930 A SELECTED AND ANNOTATED BIBLIOGRAPHY

Compiled by A. M. HANNAN, *Bibliographical Assistant, Library, Bureau of
Agricultural Economics*

FOREWORD

This bibliography is mainly concerned with the influence of weather on crops in connection with the germination, growth, development, susceptibility to disease, and final yield. It contains references to laboratory studies, field studies, and statistical studies of the effect of different conditions of temperature, precipitation, humidity, light, and wind on vegetation in many parts of the world. Most forms of vegetation, with the exception of flowers and root crops, have been included. The influence of the various weather factors on soils, on animals and animal products, and on insect pests, with the resultant reaction on crops has been reluctantly omitted. Studies of tree rings and those dealing exclusively with the effect of electric and other artificial light on plants, irrigation as a substitute for rainfall, the influence of weather on crops in storage, and maturity studies in relation to storage have not been considered. With a very few exceptions, the effect of lightning and of moonlight on crops has been omitted as well as records of phenological observations. Frost protection measures have not been considered an integral part of the bibliography but have been included when found with other material definitely pertinent.

Publications concerning the organization and administration of agricultural meteorological research work in the various countries are not included. The attention of those interested is called to a series of papers on agro-meteorological research in the Sudan, in Russia, in Germany, and in France, translations of which appeared in the Monthly Crop Weather Reports, volume 5, Nos. 4, 5, 7, January, February, and April, 1928, issued in mimeographed form by the Ministry of Agriculture and Fisheries of Great Britain, and to an editorial article in the Experiment Station Record, volume 62, No. 5, pages 401-406, April, 1930, which outlines the aims of the British

agricultural meteorological scheme and calls attention to the work of Brounov in Russia, and Azzi in Italy. Of interest, also, is the 1,199-page volume published by the Smithsonian Institution, entitled "World Weather Records Collected from Official Sources," by Felix Exner, Gilbert Walker, G. C. Simpson, H. Helm Clayton, and Robert C. Mossman, in 1927.

The Division of Crop and Livestock Estimates of the Bureau of Agricultural Economics has been working for several years on the subject of forecasting crop yield from weather data and is now using several formulas in an experimental way in a number of States. Nothing has been published as yet on this subject, as the work is still experimental.

This bibliography does not claim to be exhaustive. It merely lists such references to the subject as have been available to the compiler. Many of the periodical articles cited are followed by lists of related material which would repay study, but could not be followed up. The references included in the bibliography are limited, with a few exceptions of historical significance, to the period 1900 to 1930. The arrangement is alphabetical.

MARY G. LACY, *Librarian,*
Bureau of Agricultural Economics.

SOURCES CONSULTED

United States Department of Agriculture library card catalogue. Bureau of Agricultural Economics library card catalogue. Bureau of Plant Industry library botany card catalogue. Weather Bureau library card catalogue. Library of Congress card catalogue.
Agricultural Index, 1916—September, 1930.
Experiment Station Record, 1889-90—September, 1930.

THE INFLUENCE OF WEATHER ON CROPS

ABBE, CLEVELAND.

(1)

A FIRST REPORT ON THE RELATIONS BETWEEN CLIMATE AND CROPS . . . Prepared under the direction of . . . chief, United States Weather Bureau. 386 p. Washington, Govt. print. off., 1905. (U. S. Dept. Agr., Weather Bur. Bul. 36. (W. B. 342.))

Discusses the effect on crops of "extraordinary irregularities of climate which can not be foreseen."

ABBOT, C. G.

(2)

INFLUENCE OF SUN RAYS ON PLANTS AND ANIMALS. Smithsn. Inst. Ann. Rpt. 1926: 161-173.

Various services of sun rays to plants are discussed. One is the combining of the carbonic acid gas of the air with a watery fluid brought up through the roots of the plant to form some of the most complex substances known to organic chemistry. Another is the evaporation of water from the leaves and twigs. By this means the sun counteracts its own influence to unduly heat and scorch the leaves. Again, the sun maintains a suitable temperature.

ABELL, T. H.

(3)

SOME OBSERVATIONS ON WINTER INJURY IN UTAH PEACH ORCHARD. 28 p. Logan, 1927. (Utah. Agr. Expt. Sta. Bul. 202.)

The relation between fruit trees, especially peach trees, and temperature is discussed.

DIE ABHÄNGIGKEIT DER ERNTEERTRÄGE VON DEN WITTERUNGSFAKTOREN. Deut. Landw. Presse 31 (56): 494-495. July 13, 1904.

(4)

Humidity is of great importance in the raising of both summer and winter crops.

ADAMS, JAMES F.

(5)

OBSERVATIONS ON FROST PROTECTION AND DROUGHT SPOT OF APPLE. Phytopathology 12: 184-187. Apr., 1922.

"Considerable difference is found in the reaction of varieties [of apples] to conditions of drouth."

(6)

PLANT DISEASES AND THEIR CONTROL IN RELATION TO CLIMATIC CONDITIONS IN DELAWARE. Penin. Hort. Soc. [Del.] Trans. Ann. Meeting 39: 39-43. 1925.

It is shown that rainfall and temperature directly influence variation in disease prevalence.

(7)

THE SPORE DISCHARGE OF THE APPLE SCAB FUNGUS IN DELAWARE. 16 p. Newark, 1925. (Del. Agr. Expt. Sta. Bul. 140.)

The effect of rainfall and temperature on the prevalence of the apple-scab disease is briefly discussed.

(8)

TERMINAL SHOOT AND BUD INJURY ON PEACHES ASSOCIATED WITH LOW TEMPERATURES DURING THE SPRING OF 1925. Penin. Hort. Soc. [Del.] Trans. Ann. Meeting 39: 44-46. 1925.

ADAMS, JOHN.

(9)

DOES LIGHT DETERMINE THE DATE OF HEADING OUT IN WINTER WHEAT AND WINTER RYE? Amer. Jour. Bot. 11: 535-539. Oct., 1924.

"Both winter wheat and winter rye require a longer growing season than spring varieties of the same species . . . Both light and heat determine the heading out of the two species."

(10)

DURATION OF LIGHT AND GROWTH. Ann. Bot. [London] 38: 509-523. July. 1924.

In experimentations "conducted with 16 different species of plants, including wheat, rye, flax, hemp, soybean, tomato, buckwheat, sunflower, etc. . . . it was found that the rate of growth was more rapid at first in

ADAMS, JOHN—Continued.

the plants exposed to a diminished supply of light, but at the end those constantly exposed to daylight for a greater number of hours daily ultimately attained the greater height."

(11)

THE EFFECT OF VERY LOW TEMPERATURE ON MOIST SEEDS. Roy. Dublin Soc. Sci. Proc. (n. s.) 11, no. 1. 6 p. July, 1905.

Shows results of experiments made on pea, barley, flax, swede, red clover, meadow fescue, and timothy seeds.

(12)

THE EFFECT ON CERTAIN PLANTS OF ALTERING THE DAILY PERIOD OF LIGHT. Ann. Bot. [London] 37: 75-94. Jan., 1923.

Experiments made with wheat, Indian corn, liverleaf, white mustard, soybean, wax bean, flax, tomato, sunflower, and dandelion show that "in almost all cases the plants exposed longest to the action of light give the . . . greatest average weight, greatest average height, earliest flowers. The conclusion is drawn that growth or extension in length can take place both in light and in darkness, and that in both cases the amount of growth within a definite period of time is largely determined by the supply of available reserve material and the readiness with which this can be drawn upon by the growing parts."

(13)

THE EFFECT ON TOMATO, SOYBEAN, AND OTHER PLANTS OF ALTERING THE DAILY PERIOD OF LIGHT. Amer. Jour. Bot. 11: 229-232. Apr., 1924.

"Experiments were conducted at Ottawa, Canada, on the result of shortening the average period of daylight from about 15 hours (the natural length of day) to about 12 hours . . . In the case of tomato, both sets of plants came into flower about the same time. In the soybean the plants darkened came into flower a little earlier. The hemp nettle plants exposed to light flowered a little earlier than the others, but the darkened set were somewhat taller. In the case of the shamrock plants, the effect of darkening was to delay the average date of flowering for a period of about 11 days."

(14)

THE QUANTITATIVE STUDY OF CLIMATIC FACTORS IN RELATION TO PLANT LIFE. Roy. Soc. of Canada, Trans. (3) 10: 105-123. Dec., 1916.

Temperature, light, rainfall, evaporation, and wind are considered in relation to plant life. The data given relate to Canada.

(15)

RELATION OF FLAX TO VARYING AMOUNTS OF LIGHT. Bot. Gaz. 70: 153-156. Aug., 1920.

Experiments made with flax plants showed that those exposed to daylight attained a greater average height, a greater average weight, and produced a greater average number of capsules than those that were shaded.

(16)

SOME FURTHER EXPERIMENTS ON THE RELATION OF LIGHT TO GROWTH. Amer. Jour. Bot. 12: 398-412. July, 1925.

"The conclusion is drawn that experiments on the relation of plants to light, in order to be of value, must take into account not only the duration of light but also measurements of its intensity, as well as records of the temperature throughout the period of the experiments."

ADAMSON, J. E.

(16a)

FIGHTING THE BIG FREEZE. U. S. Mo. Weather Rev. 41: 289-291. 1913.

Reprinted by courtesy of the editor, Pacific Rural Free Press, San Francisco, Calif., issue of Mar. 15, 1913.

Methods of fighting frost in California are described.

ADERHOLD, RUDOLF.

(17)

ÜBER DAS "SCHIESSEN" DES KOHLRABIS. Mitt. Biol. Reichsanst. Land u. Forstw. Hft. 2, p. 16-17. June, 1906.

It is shown that kohlrabi plants exposed to low temperature tend to shoot into flowering.

(18)

VERSUCHE ÜBER DEN EINFLUSS HÄUFIGEN REGENS AUF DIE NEIGUNG ZUR ERKRANKUNG VON KULTURPFLANZEN. Arb. Biol. Reichsanst. Land u. Forstw. 5 (6), p. 354-360. 1907.

A study of the effect of abundant rainfall on plant diseases.

AGEE, H. P.

(19)

EFFECT OF THE HURRICANE ON THE CANE CROP. La. Planter 43: 220-222. Oct. 2, 1909.

(20)

ESSENTIAL FACTORS OF SUGAR PRODUCTION—SUGAR CANE GROWTH VALUES. La. Planter 72 (7): 132-136. Feb. 16, 1924; (8): 152. Feb. 23, 1924. Reprinted from report of experiment station, Hawaiian Sugar Planters' Association.

Correlation is shown between temperature and length of daylight and the growth of sugarcane.

(21)

SUCROSE CONTENT OF STORM-BROKEN CANE. La. Planter 43: 283. Oct. 30, 1909.

AGRICULTURAL METEOROLOGICAL CONTRIBUTIONS. Trudy Selsk. Khoz. Met., no. 10, 173 p. 1912.

(22)

In Russian. Reference given as found.

"This number of the contributions from the meteorological Bureau of the Scientific Committee of the Ministry of Agriculture of Russia contains, among others, the following articles: The Dependence of the Yield of Oats on the More Important Meteorological Conditions during 1908 and 1909, by A. P. Chernyi; Meteorological Conditions Affecting the Growth of Oats, by M. A. Evstifeeva; and Instructions for Carrying on Agricultural Meteorological Observations at Garden and Tobacco Stations, by V. O. Askinazi." Expt. Sta. Rec. 29: 509. Abstract No. Dec. 1913.

AGRICULTURAL METEOROLOGY IN AUSTRIA. [Gt. Brit.] Min. Agr. and Fisheries and Dept. Agr. for Scotland. Agricultural meteorological scheme. Mo. Crop Weather Rpts. 6(10): 1-3, July, 1930. [Mimeographed.]

(23)

Questions considered and conclusions reached at the first conference on agricultural meteorology in Austria, held in Feb., 1930.

AIKMAN, J. M.

(23a)

THE EFFECTS OF PHYSICAL FACTORS ON TRANSPIRATION RATE OF PHOTOSYNTHESIS, GROWTH, AND YIELD OF CORN PLANTED AT DIFFERENT RATES AND IN IRREGULAR STANDS. Ecological Soc. Amer. Bul. 10(4): 4. 1929.

Summary of a paper read at the meeting of the Ecological Society of America held at Des Moines and Ames, Iowa, Dec. 30, 1929-Jan. 1, 1930. See also brief note, "The cornfield's micro-climate," in Science (n. s.) v. 71, no. 1828, Jan. 10, 1930, suppl., p. XII.

AITKEN, R. D.

(24)

THE EFFECT OF SLOPE EXPOSURE UPON THE CLIMATE AND VEGETATION OF A HILL NEAR MARITZBURG: A PRELIMINARY INVESTIGATION. So. African Jour. Sci. 19: 207-217. Dec., 1922.

"The intention of the present paper is to give an account of a few results obtained in the course of a preliminary investigation into the precise differences in environmental conditions on northern and southern slopes in Natal."

AKEMINE, M.

(25)

ÜBER DAS BLÜHEN DES REISES UND EINIGE SICH DARAN ANKNÜPFENDE ERSCHEINUNGEN. Ztschr. Pflanzenzücht. 2: 339-375. July, 1914.

Abstract in Expt. Sta. Rec. 32: 130. Feb., 1915.

The development of the rice flower is studied and the influence on it of external conditions; also the relation between time or succession of blooming and grain weight and grain formation as influenced by weather.

ÅKERMAN, Å.

(26)

BESTIMMUNG DER RELATIVEN FROSTHÄRTE BEI PFLANZENVARIETÄTEN DURCH KÜNSTLICH HERVORGERUFENE KÄLTE. Organ. Mét. Internatl. Com. Mét. Agr. Procès-verbaux de la 3. réunion. p. 86-98. Copenhagen, 1929. (Statens Meteorologisk-Hydrografiska Anst.)

(27)

IAKTTAGELSE RÖRANDE HÖSTSÄDENS ÖVERVINTRING VINTERN 1921-1922. Sveriges Utsädesför. Tidskr., 32: 252-266. 1922.

The results of the author's investigations of the cold resistance of various types of wheat at Svalöf are given.

(28)

ÜBER DIE BEDEUTUNG DER ART DES AUFTAUENS FÜR DIE ERHALTUNG GEFRORENER PFLANZEN. Bot. Notiser, Hft. 2, p. 49-64; Hft. 3, p. 105-126. 1929.

ÅKERMAN, Å.—Continued.

Shows that a slow process of thawing is less injurious to frozen plants than a rapid one.

(29)

VÄXTERNAS KÖLDDÖD OCH FROSTHÄRDIGHET. Sveriges Utsädesför. Tidskr. 29 (2): 61-85, 1919.

Winter hardiness of crops is discussed.

and JOHANSSON, H.

(30)

BETRÄGGE ZUR KENNTNIS DER KÄLTERESISTENZ DES WINTERWEIZENS. Ztschr. Pflanzenzücht. 5: 349-356, Dec., 1917.

The power of resistance to cold of winter wheat is discussed.

and JOHANSSON, H.

(31)

BIDRAG TILL EN UTREDNING AV FRAGEN OM HÖSTVETESORTERNAS VINTERHÄRDIGHET. Sveriges Utsädesför. Tidskr. 27: 77-83, 1917.

As a result of experiments with wheat made in Sweden it was found that a perfect parallelism existed between its resistance to cold and its sugar content.

and LINDBERG, J.

(32)

STUDIEN ÜBER DEN KÄLTETOD UND DIE KÄLTERESISTENZ DER PFLANZEN NEBST UNTERSUCHUNGEN ÜBER DIE WINTERFESTIGKEIT DES WEIZENS. Lund, 1927.

Abstract in Ann. Sci. Agron. Franç. et Étrang. 46 (2): 232-233. Mar.-Apr., 1929.

Not examined. Reference given as found.

It is concluded that, as a general rule, killing by cold is the consequence of a too large formation of ice in the tissues. The authors show that a perfect correlation exists between the over-wintering capacity, the resistance to cold, and the sugar content of the different varieties of wheat during the winter.

JOHANSSON, H., and PLATON, B.

(33)

FÖRTSÄTTA UNDERSÖKNINGAR RÖRANDE SOCKERHALT OCH TORRSUBSTANSHALT HOS NÅGRA HÖSTVETESORTER. Sveriges Utsädesför. Tidskr. 28: 216-224, 1918.

Abstract by M. O. Malte in Agr. Gaz. Canada 6: 329-331. Apr., 1919.

Investigations carried on in Sweden with wheat varieties indicate that, "although both the dry-matter content and the sugar content were found to vary considerably with the temperature, there seemed to exist a distinct relation between sugar content and winter hardiness."

ALAM, MAHBUB.

(34)

THE PROBLEM OF STERILITY IN INDIAN CROPS AND FRUIT TREES. Agr. Jour. India 24: 293-314. Sept., 1929.

Among the causes of plant sterility which are discussed in this paper are light and humidity.

ALBERT, W. B.

(35)

STUDIES ON THE GROWTH OF ALFALFA AND SOME PERENNIAL GRASSES. Amer. Soc. Agron. Jour. 19: 624-654. July, 1927.

An "unexpected result" of the experiments described "was the large amount of winterkilling in the common alfalfa under all but the most favorable conditions."

ALBERTS, H. W.

(36)

MOISTURE CONTENT OF CORN IN RELATION TO RELATIVE HUMIDITY AND TEMPERATURE OF THE ATMOSPHERE. Amer. Soc. Agron. Jour. 18: 1029-1034. Nov., 1926.

"In the following investigation an attempt was made to determine the percentage of moisture that may be expected in corn at various temperatures and relative humidities."

ALDOUS, A. E., and SHANTZ, H. L.

(37)

TYPES OF VEGETATION IN THE SEMIARID PORTION OF THE UNITED STATES AND THEIR ECONOMIC SIGNIFICANCE. Jour. Agr. Research 28: 99-128. April 12, 1924.

ALEXANDER, WILLIAM H.

(38)

A DROUGHTY YEAR (1925) WITH BUMPER CROPS (IN OHIO). Author's abstract. Amer. Met. Soc. Bul. 7 (1): 14-16. Jan., 1926.

"We conclude that the bumper crops in Ohio in 1925 were the result of an unusually fortuitous combination and distribution of the major climatic elements, such as rainfall, temperature, sunshine, winds, etc., to excellent cultivation and to the complete absence of all climatic misfortunes."

ALEXANDER, WILLIAM H.—Continued.

FROST AND FRUIT IN SOUTHERN OHIO IN 1917. U. S. Mo. Weather Rev. 49: 232-234. Apr., 1921. (39)

The author attributes a large part of the damage done to fruit in southern Ohio in 1917 to May weather conditions.

OHIO WEATHER AND THE SUGAR BEET. Amer. Met. Soc. Bul. 8 (3): 50. 1927. (39a)

This is the author's abstract of a paper delivered at a meeting of the American Meteorological Society held in Philadelphia, December 30-31, 1926.

"Long days during the early life of the plant with summer temperatures averaging between 63° F. and 73° F. and a rainfall sufficient to keep a steady growth until near harvest seem to be, briefly, the chief meteorological requirements. The contention of the German agriculturists that the hours of sunlight to which the beet has been exposed . . . is the limiting factor with regard to high sugar content, does not seem to be sustained by the Ohio data . . . Some study has also been made and rather important conclusions reached regarding the relation between weather conditions and the development of epidemic diseases and pests, especially the fungus disease known as *Cercospora beticola*."

ALEXANDROV, A.

[INFLUENCE OF SPRING PRECIPITATION ON THE YIELD OF OATS AND POTATOES AND ON THE STARCH CONTENT OF POTATOES.] Zemledyel' Cheskaya. Ghazeta 41: 579-581. 1905. (40)

In Russian. Not examined.

"On the basis of experiments at the Viatka Experiment Station the author concludes that for oats May rains are more important than June rains, the optimum precipitation during the vegetation period being about 68 mm.; for potatoes, the greater the precipitation in May and June the less the yield and the starch content, and conversely." Expt. Sta. Rec. 19: 115. 1907-8.

ALLARD, H. A.

DAYLIGHT A FACTOR IN FLOWERING. U. S. Dept. Agr. Yearbook 1926: 306-309. 1927. (41)

ALLEN, CHARLES C.

THE FRUIT-FROST WORK OF THE WEATHER BUREAU IN THE UPPER SAN JOAQUIN VALLEY. U. S. Mo. Weather Rev. 57: 424-425. Oct., 1929. (42)

ALLEN, F. W.

FACTORS CORRELATED WITH HARDINESS IN THE APPLE. AMER. SOC. HORT. SCI. Proc. 1914: 130-137. (43)

Factors which influenced the ability of the apple tree to withstand cold are discussed.

ALTER, J. CECIL

ALFALFA SEED GROWING AND THE WEATHER, IN UTAH. U. S. Mo. Weather Rev. 47: 330-332. May, 1919. (44)

The author discusses the weather conditions necessary for a successful alfalfa crop grown for seed in Utah.

ALFALFA SEED GROWING AND THE WEATHER, WITH PARTICULAR REFERENCE TO CONDITIONS IN UTAH. 31 p. Logan, 1920. (Utah Agr. Expt. Sta. Bul. 171.) (45)

Contains a study of weather conditions which affect the growth of alfalfa.

DOES FROST FIGHTING PAY IN UTAH? U. S. Mo. Weather Rev. 40: 606-608. 1912. (45a)

VALUE OF MOUNTAINS TO CLIMATIC SAFETY FOR THE FRUIT GROWER. U. S. Mo. Weather Rev. 39: 1248-1249. Aug., 1911. (46)

The author shows that mountains are actual assets, and not encumbrances, as weather producers and regulators.

AMERICAN SOCIETY FOR HORTICULTURAL SCIENCE.

PROCEEDINGS, 1918. (47)

Contains the following papers: Winter Injury in Canada, by W. T. Macoun; Winter Injury in New York, by W. H. Chandler; Winter Injury

AMERICAN SOCIETY FOR HORTICULTURAL SCIENCE—Continued.

in New Jersey, by M. A. Blake; Winter Injury in Indiana, by J. Oskamp; Winter Injury in Ohio, by W. D. Paddock; Winter Injury in Wisconsin, by J. G. Moore; Pruning Winter Injured Peach Trees, by A. J. Gunderson; Hardiness in Top-Worked Varieties of the Apple, by M. J. Dorsey.

ANDERSON, ESTHER S.

(47a)

THE BEET SUGAR INDUSTRY OF NEBRASKA AS A RESPONSE TO GEOGRAPHIC ENVIRONMENT. *Econ. Geogr.* 1: 373-386. 1925.

The effect of temperature, sunshine, moisture, and rainfall on the growth and sugar content of beets is briefly indicated.

ANDRÉ, G.

(48)

ACTION DE LA TEMPÉRATURE SUR L'ABSORPTION MINÉRALE CHEZ LES PLANTES ÉTIOLÉES. *Compt. Rend. Acad. Sci.* [Paris] 134: 668-671. Mar. 17, 1902.

The effect of temperatures of 15° and 30° C. on the absorption of minerals by etiolated plants of maize and beans is studied.

ANDRÉ, HANS.

(49)

SYNTHETISCHE BETRACHTUNGEN ZUM RHYTHMISCHEN WACHSTUM UND ZU DEN REIZBEWEGUNGEN DER PFLANZE. *Biol. Zentbl.* 46 (2): 97-111. 1926.

Rhythm in plant growth and its reaction to light is discussed.

ANDREWS, F. M.

(50)

STARCH FORMATION. *Ind. Acad. Sci. Proc.* 35: 182-184. 1925.

"The present paper deals especially with the length of time necessary for the formation of starch by chloroplasts of different plants in daylight."

ANGELO, E.

(51)

THE RECOVERY OF GRAPE VINES WHEN THE YOUNG SHOOTS ARE KILLED BY SPRING FROSTS. *Amer. Soc. Hort. Sci. Proc.* 1922: 29-32.

A study is made of the extent and manner of recovery of certain varieties of grapes when all the first shoots were killed by frost.

ANGREMOND, A. d'.

(52)

DE Y 10, DE E 1, EN DE DWERGBOOM X KANARI-HYBRIDE, ONDERLING VERGELEKEN. *Meded. Klaten, Java Proefsta. Vorstenlandsche Tabak.* no. 33, p. 67-85. 1918.

Abstract in *Internatl. Rev. Sci. and Pract. Agr.* [Rome] 10 (10-12): 1124. Oct.-Dec., 1919.

"There are material differences between the various types [of tobacco] in resistance to wind. The action of strong air current influences in various ways and degrees the plants, preventing development and reducing the yield to one-third of the normal quantity and even to less. Under equal conditions the number of these plants varies, being naturally all the smaller the greater the resistance to wind . . . The varying degree of wind resistance probably explains the difference in yield per unit of area in favour of the most resistant type, viz, Dwergboom X Kanari."

ÅNGSTRÖM, ANDERS.

(53)

PRELIMINAR UNDERSÖKNING RÖRANDE TEMPERATURFÖRHÅLLENDE ÖVER TORR OCH SANK MARK. 7 p. Stockholm, 1924.

A preliminary investigation of conditions of temperature above dry and swampy fields.

ANNETT, HAROLD E.

(54)

THE DATE SUGAR INDUSTRY IN BENGAL. AN INVESTIGATION INTO ITS CHEMISTRY AND AGRICULTURE. *India. Dept. Agr. Mem., Chem. Ser.* 2: 281-389. Mar., 1913.

A brief account is given of the effect of temperature and of cloudy, rainy, or misty weather on the date palm.

(55)

THE EFFECT OF ENVIRONMENTAL FACTORS ON THE ALKALOIDAL CONTENT AND YIELD OF LATEX FROM THE OPIUM POPPY (*PAPAVER SOMNIFERUM*) AND THE BEARING OF THE WORK ON THE FUNCTIONS OF ALKALOIDS IN PLANT LIFE. *India. Dept. Agr. Mem., Chem. Ser.* 6: 61-154. Sept., 1921.

The influence of climate, season, and weather on the opium plant is discussed.

ANTEVS, ERNST W.

(56)

THE BIG TREE AS A CLIMATIC MEASURE. *In* Quaternary climates, p. 115-153. (Carnegie Inst. Wash. Pub. 352.) 1925.

"The chief climatic factors influencing tree-growth . . . appear to be precipitation, temperature, and sun radiation. The relative rôle of each factor is dependent on the time of its influence, upon other factors, upon internal conditions in the tree, upon earlier conditions in general, etc. . . . Before satisfactory interpretation of the sequoia curves and

ANTEVS, ERNST W.—Continued.

conclusions from them regarding the climate of the past can be made, it is necessary to have data on temperature, better knowledge of the relation between precipitation and growth of sequoia trees in dry situations," and general knowledge of the rôle for growth played by the radiation of the sun."

ANTONOV, S.

(57)

SUSCEPTIBILITY OF SPRING WHEAT TO BUNT IN RELATION TO DATE OF SOWING. In *Sibirskii Inst. Selsk. Khoz. Lesovodstva*. (Siberian Inst. Agr. and Forestry, Trans.) 5: 99-112. 1926.

In Russian.

AOKI, S., and TAZIKA, Y.

(58)

TEMPERATURE AND THE BLOOMING OF CHERRY TREES. *Jour. Met. Soc. Japan*. 40 (4): 93-102. Apr., 1921.

In Japanese. Summary in English.

The author establishes a correlation between temperature and the blossoming period of cherry trees. But he calls attention to the fact that, for forecasting purposes, other factors, such as wind, rainfall, and humidity, must also be taken into consideration. The period covered by the records is from 1900 to 1920.

APELT, ARTHUR.

(59)

NEUE UNTERSUCHUNGEN ÜBER DEN KÄLTETOD DER KARTOFFEL. *Cohn. Beiträge zur Biologie der Pflanzen*. 9 (2): 215-262. 1907.

Various theories with regard to the effect of frost on potatoes are discussed.

APPLEMAN, CHARLES O., and EATON, S. V.

(60)

EVALUATION OF CLIMATIC TEMPERATURE EFFICIENCY FOR THE RIPENING PROCESSES IN SWEET CORN. *Jour. Agr. Research* 20: 795-805. March 1, 1921.

"The present paper deals with the chemical changes in sweet corn during ripening and the effect of climatic temperature on rate of these changes. An attempt has also been made to evaluate the climatic temperature efficiency for these processes and to make the results of some practical value as a guide for picking corn in different localities and in different seasons in the same locality."

ARCHIBALD, E. DOUGLAS.

(61)

DROUGHTS, FAMINES, AND FORECASTS IN INDIA. *U. S. Mo. Weather Rev.* 28: 246-248. June, 1900.

The author discusses the causes of famine in India which have been summarized as follows: "(1) Prolonged delay in the commencement of the rains, more especially of the summer monsoon; (2) a prolonged break in the middle of the southwest monsoon rains; (3) scanty rainfall during the greater part or the whole of the season; (4) unusually early termination of the southwest monsoon rains; this last being especially fatal in the case of rice crops on unirrigated land."

ARCTOWSKI, HENRYK.

(62)

STUDIES ON CLIMATE AND CROPS. *Amer. Geogr. Soc. Bul.* 42 (4): 270-282. Apr., 1910; (7): 481-495. July, 1910; 44 (10): 745-760. Oct., 1912.

A study of the effect of seasonal variations of weather upon wheat and corn crops.

ARMARI, BEATRICE.

(63)

CONTRIBUZIONE ALLO STUDIO DELL'INFLUENZA DEL CLIMA E DELLA STAZIONE SOPRA LA STRUTTURA DELLE PIANTE DELLA REGIONE MEDITERRANEA. *Ann. Bot. [Rome]* 1 (fasc. 1): 17-41. May 15, 1903.

Contains a study of drought resistance.

ARNAUD, GABRIEL.

(64)

EFFETS DE LA GRÊLE SUR LES ARBRES. *Soc. Path. Vég. France Bul.* 2 (fasc. 2): 121-122. Mar., 1916.

The effect of hail on trees is noted.

LES GELÉES ET LES ALTÉRATIONS DES FEUILLES D'ARBRES. *Soc. Path. Vég. France Bul.* 1 (fasc. 1): 21-25. Nov., 1914.

The effect of frost on leaves of trees is noted.

ARNDT, C. H.

(66)

CONFIGURATION AND SOME EFFECTS OF LIGHT AND GRAVITY ON *COFFEA ARABICA* L. *Amer. Jour. Bot.* 16: 173-178. Mar., 1929.

An account of experiments made to determine the effect of light and gravity on the configuration of the coffee tree.

- ARMY, A. C. (67)
WINTER HARDINESS OF MEDIUM RED CLOVER STRAINS. Jour. Amer. Soc. Agron. 16: 268-278. Apr., 1924.
The author studies the kind of clover seed that will withstand the cold winter weather of Minnesota.
- ARTHUR, JOHN M. (68)
SOME EFFECTS OF RADIANT ENERGY ON PLANTS. Jour. Optical Soc. Amer. and Rev. Sci. Instruments. 18: 253-263. Mar., 1929.
- WORK TO DATE AT BOYCE THOMPSON INSTITUTE FOR PLANT RESEARCH ON EFFECT OF LIGHT ON PLANT GROWTH. Illuminating Engin. Soc. Trans. 19: 995-997. Dec., 1924. (69)
- "Results are presented by two series of experiments with plants grown under artificial illumination and under controlled conditions as to temperature and humidity. The experiments were conducted so as to afford a comparison of results obtained under different intensities of illumination and the effect of the introduction of additional carbon dioxide."
- and GUTHRIE, JOHN D. (70)
EFFECT OF LIGHT, CARBON DIOXIDE, AND TEMPERATURE ON FLOWER AND FRUIT PRODUCTION. Hort. Soc. N. Y. Mem. 3: 73-74. 1927.
Abstract in Expt. Sta. Rec. 60: 806-807. June, 1929.
- and others. (71)
SOME EFFECTS OF ARTIFICIAL CLIMATES ON THE GROWTH AND CHEMICAL COMPOSITION OF PLANTS. Amer. Jour. Bot. 17: 416-482. May, 1930.
"This report is concerned with the growth of plants in artificial climates. Some of the plants were grown with artificial light only as a source of energy for photosynthesis. Other plants were grown with daylight supplemented with artificial light for 6 to 12 hours each night. An attempt was made to grow plants throughout their life history with photosynthesis at or near its maximum rate by supplying a high light intensity and long day along with increased carbon dioxide concentration and a relatively high temperature. The effect of length of day on certain species was also studied in various combinations of temperature and carbon dioxide supply. Chemical analyses of many plants grown under the different conditions are given, together with a discussion of the effect of various factors on the percentage [of] carbohydrate and nitrogen in various tissues."
- ASKINAZI, V. O. (W. ASKINAZY). (72)
THE "SUKHOVEY" (HOT WINDS) OF THE PLAINS OF SOUTHEASTERN EUROPE [translated title]. Izv. Nauch. Melior. Inst., (Jour. Sci. Inst. Amelior.) 17: 69-114. (1928).
In Russian. English abstract p. 112-114. Abstract in Expt. Sta. Rec. 60: 418. Apr., 1929.
Not examined. Reference given as found.
"The conditions responsible for and accompanying these hot winds and the nature of the injury to plants caused by them are explained. The injurious effect of the winds is attributed to the fact that the high temperature causes plants to give off moisture faster than they can draw it from the soil through their roots, and it is pointed out that the winds are especially disastrous when conditions are most favorable for a good crop. Three means of combating the winds are discussed: (1) Irrigation, especially by spraying; (2) use of dry farming methods; and (3) selection of resistant plants."
- ATANASOFF, D., AND JOHNSON, A. G. (73)
TREATMENT OF CEREAL SEEDS BY DRY HEAT. Jour. Agr. Research 18: 379-390. Jan. 2, 1920.
"The data at hand indicate that the various cereals—barley, wheat, rye, and oats—especially when of good quality and well-dried, are able to withstand protracted exposures to dry heat at comparatively high temperatures."
- ATKINS, W. R. G. (74)
SOME RECENT RESEARCHES IN PLANT PHYSIOLOGY. 328 p. London, Whittaker & Co., 1916.
Chapter 1 deals with the carbohydrates of the angiosperm leaf in relation to photosynthesis (p. 1-35).

ATKINS, W. R. G. and POOLE, H. H.

(75)

PHOTOELECTRIC MEASUREMENTS OF ILLUMINATION IN RELATION TO PLANT DISTRIBUTION. Pt. 1-2. Roy. Dublin Soc. Sci. Proc. (n.s.) 18 (25): 277-298. Sept., 1926; 19 (24): 295-309. Sept., 1929.

"Data are presented showing the behaviour of certain plants growing in varying degrees of shade."

ATKINSON, ALFRED, and LOVE, H. H.

(76)

A BIOMETRICAL ANALYSIS OF THE EFFECT OF ENVIRONMENT ON A PURE LINE OF OATS. Jour. Amer. Soc. Agron. 20: 1251-1291. Dec., 1928.

"Data obtained with the same pure line of oats grown for a period of eight years in Montana and in New York are presented." Temperature, growing temperature during the crop season, length of daylight, hours of sunshine, and the interrelation of these factors are considered. The general conclusion is that environment is more important than source of seed.

AUCHTER, EUGENE C., and HARLEY, C. P.

(77)

EFFECT OF VARIOUS LENGTHS OF DAY ON DEVELOPMENT AND CHEMICAL COMPOSITION OF SOME HORTICULTURAL PLANTS. Amer. Soc. Hort. Sci. Proc. 21: 199-214. 1924.

"The amount of continuous light or the relative length of day influenced the time at which blossoms were produced on different horticultural plants . . . When plants were subjected intermittently to light and darkness . . . blossoming was greatly delayed, although the total amount of light received was about the same as that received by the short day plants." The chemical composition of plants is shown to vary with the length of daylight.

— and SCHRADER, A. L.

(78)

THE INFLUENCE OF SHADE ON THE BEHAVIOR OF APPLE TREES. Internatl. Cong. Plant Sci. Proc. 2: 1054-1069. Ithaca, N. Y., 1926.

— and others.

(79)

THE EFFECT OF SHADE ON THE GROWTH, FRUIT BUD FORMATION, AND CHEMICAL COMPOSITION OF APPLE TREES. Amer. Soc. Hort. Sci. Proc. 1926: 368-382.

The effects are given of the shading of a whole Stayman Winesap apple tree in 1922 and 1923.

AUSTRALIA, BUREAU OF METEOROLOGY.

(80)

RESULTS OF RAINFALL OBSERVATIONS MADE IN SOUTH AUSTRALIA AND THE NORTHERN TERRITORY . . . Published . . . under the direction of H. A. Hunt, Commonwealth Meteorologist. 421 p. Melbourne, H. J. Green, Acting Govt. printer, 1918.

Includes notes on the monthly and annual rain distribution over South Australia and the Northern Territory, 1876 to 1917, by R. F. Griffiths, and a brief article with a map and tables showing the summer and winter rainfall and the wheat yield over a number of years.

AZZI, GIROLAMO.

(81)

IL CLIMA DEL GRANO IN ITALIA. Nuovi Ann. [Italy] Min. Agr. 2; p. 453-624. Sept. 30, 1922.

A study of the effect of climatic and weather conditions on wheat in different parts of Italy.

(82)

LA CLIMAT DU BLÉ DANS LE MONDE: LES BASES ÉCOLOGIQUES DE LA CULTURE MONDIALE DU BLÉ . . . 1161 p. Rome, Impr. de l'Institut International d'Agriculture, 1927.

At head of title: Épreuve. Conférence Internationale du Blé, organisée par l'Institut International d'Agriculture (Rome, 25 avril, 1927).

The author studies the effect of adverse weather conditions such as excessive humidity, insufficient rainfall, high or low temperatures, on wheat in the wheat-producing regions of the world.

(83)

ECOLOGIA AGRARIA. 237 p. Torino, Unione tipografico-editrice torinese, 1928.

The effect of environment and more particularly of meteorological factors on plant life is discussed at length. Chapter 12 deals with photoperiodism and the influence of precipitation and temperature on plant development. Special studies are made in connection with wheat, olives, and vines. A tentative cadastral survey of atmospheric conditions in Umbria is outlined in relation to the growth of wheat, maize, olives, vines, clover, lucerne, and lupine.

AZZI, GIROLAMO—Continued.

(84)

EFFETTO DEI FATTORI METEOROLOGICI SULLO SVILUPPO E IL RENDIMENTO DEL MAIS IN UMBRIA. *Coltivatore* 73 (34): 492-497. Dec. 10, 1927.

The effect of weather conditions on the development and yield of maize in Umbria is discussed.

(85)

L'INFLUENCE DES FACTEURS MÉTÉOROLOGIQUES SUR LES RENDEMENTS DU FROMENT DANS LA PROVINCE DE BOLOGNE. *Russia. Met. Biuro. Trav. Met. Agr. livr.* 14, p. 19-47, 1915.

Russian with French translation.

The effect of rainfall on the yield of wheat in the province of Bologna is studied.

Abstract in *Expt. Sta. Rec.* 34: 208. Abstract Number Feb., 1916.

"Studies made according to the Russian method of determining critical periods in plant growth are reported, the results showing that the critical period for wheat as regards rainfall occurs during the two 10-day periods immediately preceding heading."

(86)

L'INFLUENCE DES PHÉNOMÈNES MÉTÉOROLOGIQUES SUR LA VÉGÉTATION. *Note in Rev. Sci.* 58 (4): 115-116. Feb. 28, 1920.

Translated by Katharine Davis in *U. S. Mo. Weather Rev.* 48: 643. Nov., 1920.

Brief reference to the relations existing between the critical periods of vegetation and meteorological phenomena.

(87)

INFLUENZA DEI FATTORI METEOROLOGICI SULLO SVILUPPO E RENDIMENTO DELLA VITE IN UMBRIA. *Coltivatore* 75 (5) 132-138. Feb. 20, 1928.

The author discusses the influence of temperature and rainfall on the yield and quality of the vine in Umbria during the period 1908 to 1919.

(88)

THE PROBLEM OF AGRICULTURAL ECOLOGY. *U. S. Mo. Weather Rev.* 50: 193-196. Apr., 1922.

The author presents his system of research in connection with the study of the different meteorological factors and their relation to the development and yield of plants.

(89)

IL PROBLEMA METEORICO-AGRARIO. *Soc. Met. Ital. Bol. Bimens.* (3) 35 (6-8): 25-32; (9-10): 39-42. 1916.

Abstract in *Internatl. Rev. Sci. and Pract. Agr.* [Rome] 11 (3): 227-228. Mar., 1918.

The principles necessary to the solution of the problems of agricultural meteorology are discussed, and the importance of the science is stressed.

(90)

RICERCHE SPERIMENTALI SUL PERIODO CRITICO DEL FRUMENTO RISPETTO ALLE PIOGGIE. *Nuovi Ann. [Italy] Min. Agr.* anno 1, no. 2, p. 299-307. Dec. 31, 1921.

Experimental research has confirmed the existence of a critical period in the growth of wheat during which the amount of precipitation is of great importance.

(91)

RICERCHE SUI FENOMENI DI FOTOPERIODICITÀ. *Ital. Agr.* 64 (6): 336-340. June, 1927.

A study of the photoperiodism of plants.

BACH, WALTER J.

(92)

FROST DAMAGE TO CITRUS; INJURY AND TREATMENT. *Citrus Indus.* 11 (4): 7-8, 25. Apr., 1930.

A BACTERIAL STALK ROT OF MAIZE. *Agr. Jour. India* 25 (pt. 1): 72. Jan., 1930.

(93)

Attention is drawn to outbreak of this disease at Pusa in 1928 and 1929. "No preventive or remedial measures for the disease can be recommended; the outbreaks generally occur during dull, cloudy weather, following heavy rain, and it is only in such weather that artificial inoculations have taken effect."

BADOUX, H.

(94)

UN CAS INTÉRESSANT DE L'INFLUENCE DU GEL SUR L'ÉPICÉA DE L'HIMALAYA. *Jour. Forestier Suisse* 79: 171-172. July, 1928.

An account of frost resistance in the case of a Himalaya pitch pine at Zurich.

- BAILEY, CLYDE HAROLD. (95)
THE RESPIRATION OF FROSTED WHEAT PLANTS. RESPIRATION OF CEREAL PLANTS
AND GRAINS IV. Jour. Biol. Chem. 44: 13-15. Oct., 1920.
- BAILEY, L. H. (96)
DRY FARMING IN THE EAST. U. S. Mo. Weather Rev. 38: 1310-1311. Sept.,
1910.
It is suggested that even in humid regions conservation of rainfall is
advisable to safeguard crops against unexpected drought.
- BAIN, HENRY F. (97)
THE RELATION OF TEMPERATURE DURING THE BLOSSOMING PERIOD TO THE
SETTING OF CRANBERRIES. Wis. State Cranberry Growers' Assoc. Ann.
Meeting 40: 23-27. Dec. 7, 1926.
- BAKER, FREDERICK S. (98)
EFFECT OF EXCESSIVELY HIGH TEMPERATURES ON CONIFEROUS REPRODUCTION.
Jour. Forestry 27: 949-975. Dec., 1929.
"The living tissues of seedlings of representative conifers of western
America (1 to 3 months old) are quickly killed when a temperature of
about 54° C. (130° F.) is reached, but can withstand a temperature
only a few degrees lower for some time."
- BAKKE, A. L. (99)
A NEW FACTOR IN THE DETERMINATION OF THE HARDINESS OF THE APPLE.
Amer. Soc. Hort. Sci. Proc. Ann. Meeting 17: 279-289. 1920.
"It is found that the time of the season is the important consideration
in determinations of hardness."
- BALFOUR, ISAAC BAYLEY. (100)
DROUGHT AND GARDENING. Jour. Roy. Hort. Soc. 38 (pt. 2): 206-216. 1912.
- BALL, C. R., and others. (101)
WHEAT PRODUCTION AND MARKETING. U. S. Dept. Agr. Yearbook 1921: 77-
160.
Includes brief section on natural factors influencing production, includ-
ing rainfall, snow, and low temperatures.
- BALLANTYNE, A. B. (102)
BLOOMING PERIODS AND YIELDS OF FRUIT IN RELATION TO MINIMUM TEMPERA-
TURES. p. 245-261. Logan, 1913. (Utah Agr. Exp. Sta. Bul. 128.)
The effect of frost at blooming time on various kinds of fruit is
studied. "Generally frosts of from 5° to 9°, when the buds are moist,
are less damaging than those of a similar or slightly greater severity
when the buds are dry."
- BALLS, W. LAWRENCE. (103)
THE COTTON PLANT IN EGYPT. 202 p. London, Macmillan & Co. (Ltd.), 1912.
"During the first stage, which includes the period from sowing to
flowering, the plant is mainly under the control of aerial conditions."
The effect of weather conditions on the cotton plant is discussed in chap-
ter 2.
- (104)
METEOROLOGICAL CONDITIONS IN A FIELD CROP, WITH A DESCRIPTION OF TWO
SIMPLE RECORDERS. Quart. Jour. Roy. Met. Soc. [London] 39 (166): 109-
112. Apr., 1913.
Contains a description of experiments showing the effect of weather
conditions on cotton in Egypt. It is shown that cotton plants lower the
temperature and raise the humidity of the surrounding air. A breeze
will raise the temperature and lower the humidity, resulting in an in-
crease of tissue temperature and a consequent increased growth-rate of
the plant.
- (105)
TEMPERATURE AND GROWTH. Ann. Bot. [London] 22: 557-589. Oct., 1908.
"The object of the present paper is to analyze the effects produced
upon the growth-process by the temperature factor. The research . . .
developed into an attempt to determine the chemical effects of the tem-
perature-factor by studying the pathological portion of the growth-
temperature curve; and hence to demonstrate that the time-factor is
chemical in its nature, and that its effects can be simulated immediately."
- BAMBACIONI VALERIA. (106)
RISULTATI DI ALCUNE ESPERIENZE IN RELAZIONE COL FENOMENO DELL' INGALLI-
MENTO DEI VEGETALI. Ann. Bot. [Rome] 18: 237-252. July 15, 1929.
The effect of light and of temperature on a number of plants is studied.

- BARKER, B. T. P., and GIMINGHAM, C. T. (107)
WIND SCORCH OF APPLE FOLIAGE. Bristol Univ. Agr. and Hort. Research Sta.
Ann. Rpt. 1913: 67-68.
- BARKLEY, HENRY. (108)
CLIMATIC CONTROL OF WOOL PRODUCTION. SOME RECENT INVESTIGATIONS. Aus-
tralian Wool Ann. 1: 68-80. 1927-1928.
The effect of rainfall on wool production is discussed from several
angles. (109)
- FORECASTING ECONOMIC CONDITIONS IN AUSTRALIA. THE IMPORTANCE OF THE
CLIMATIC FACTOR. Econ. Rec.; Jour. Econ. Soc. Australia and New Zea-
land 2: 161-173. Nov., 1926.
"The spring rainfall in Northern Victoria appears to be an important
factor governing some branches of primary production and serving as an
index to others, not only in Australia, but, in the case of wheat, through-
out the world. For this reason it provides valuable data for forecasting
economic conditions during the following calendar year. As an early
index to the wheat yield it should serve to check undue speculation, to
indicate our jute requirements and the necessary shipping space, in addi-
tion to forecasting a large part of the national income from exports." (110)
- SOME CORRELATIONS BETWEEN RAINFALL AND PRODUCTION IN AUSTRALIA. Na-
ture [London] 120 (3016): 270. Aug. 20, 1927.
This is a summary of a paper read to the University of Melbourne Agri-
cultural Society on June 10, 1927.
Correlation is shown between rainfall and wheat yield. (111)
- THE VICTORIAN WHEAT HARVEST. CLIMATIC CONTROLS AND WORLD PRICES.
Wheat and Grain Rev. 7 (6): 8-11. Aug. 6, 1927.
"The August-September rainfall over Northern Victoria is responsible
for 80 per cent of the variations in the wheat yield, and the effect of the
other months is approximately known. This permits of a reasonably
accurate forecast of the crop at the end of September, and a slight revision
a month later . . . As the result of its situation amid the Aus-
tralian wheat districts, and of its sensitivity to solar changes, the North-
ern Victoria harvest, and, therefore, the spring rainfall, are not only an
index to the Australian harvest, but also to world supplies and world
prices." (112)
- BARNES, B. (112)
VARIATIONS IN EUROTIIUM HERBARIORUM, (WIGG.) LINK. INDUCED BY THE ACTION
OF HIGH TEMPERATURES. Ann. Bot. [London] 42: 783-812. Oct., 1928.
- BARNES, J. H. (113)
SUGAR AND THE SUGARCANE IN THE GURDASPUR DISTRICT. Agr. Research Inst.,
Pusa, Bul. 69, 100 p., 1918.
Results are given of an investigation into the nature and extent of
the damage done to sugarcane by frost in the Gurdaspur district of
the Punjab.
- BAROULINA, E. I. (114)
ON THE RESISTANCE OF WINTER CEREALS TO WINTER COLD. Inst. Agron. Ann.
Saratov t. 1, livr. 1, p. 42-57. 1923.
In Russian. English summary, p. 56-57.
- BARRON, WILLIAM E. (115)
CLIMATIC ASPECTS OF COTTON GROWING IN SOUTHERN ILLINOIS AND MISSOURI.
Amer. Met. Soc. Bul. 7 (2): 24-25. Feb., 1926.
This is the author's abstract of a paper given at the meeting of the
American Meteorological Society in Kansas City, in Dec., 1925.
- BARRY, FREDERICK. (116)
THE INFLUENCE OF TEMPERATURE ON CHEMICAL REACTION IN GENERAL. Amer.
Jour. Bot. 1: 203-225. May, 1914.
- BARTRAM, H. E. (117)
EFFECT OF NATURAL LOW TEMPERATURE ON CERTAIN FUNGI AND BACTERIA.
Jour. Agr. Research 5: 651-655. Jan. 3, 1916.
"The present work is a record of the fact that certain fungi and
bacteria are able to withstand extreme cold, while others succumb to
it, but does not attempt to advance any theory as to the internal changes

BARTRAM, H. E.—Continued.

which contribute to the weakening or death of the organisms thus tested."

BASTIN, S. LEONARD.

(118)

DOES COLD KILL PLANTS? *Sci. Amer.* 123: 427. Oct. 23, 1920.

"It seems reasonable that the observed damage to standing vegetation in winter is a matter of evaporation."

BATCHELOR, LEON D.

(119)

WINTER INJURY TO YOUNG WALNUT TREES 1921-22. *Calif. Dept. Agr. Mo. Bul.* 11 (5-6): 445-449. May-June, 1922.

— and REED, H. S.

(120)

WINTER INJURY OR DIE-BACK OF THE WALNUT. 20 p. Berkeley, 1919. (*Calif. Agr. Expt. Sta. Circ.* 216.)

Among the most common causes of winter injury of the Persian walnut are early autumn frosts and winter drought.

— and WEST, F. L.

(121)

VARIATIONS IN MINIMUM TEMPERATURES DUE TO THE TOPOGRAPHY OF A MOUNTAIN VALLEY IN ITS RELATION TO FRUIT GROWING. 27 p. Logan, 1915. (*Utah Agr. Expt. Sta. Bul.* 141.)

"The present publication is a preliminary report of investigations which were planned to measure the extent of temperature variations" in mountain valleys and their relation to fruit growing.

BATES, CARLOS GLAZIER.

(122)

A DROUGHT-RESISTANT HICKORY. *Science (n. s.)* 27: 473-474. Mar. 20, 1908.

(123)

FOREST TYPES IN THE CENTRAL ROCKY MOUNTAINS AS AFFECTED BY CLIMATE AND SOIL. *U. S. Dept. Agr. Bul.* 1233, 152 p. Oct. 6, 1924.

Temperature, wind, humidity, evaporation, sunshine, and precipitation are studied in their relation to forest trees.

(124)

THE FROST HARDINESS OF GEOGRAPHIC STRAINS OF NORWAY PINE. *Jour. Forestry* 28: 327-333. Mar., 1930.

(125)

PHYSIOLOGICAL REQUIREMENTS OF ROCKY MOUNTAIN TREES. *Jour. Agr. Research* 24: 97-164. 1923.

Results of experiments are given which determine the effect of light, temperature, moisture, and drought on tree growth.

(126)

THE RELATIVE LIGHT REQUIREMENTS OF SOME CONIFEROUS SEEDLINGS. *Jour. Forestry* 23: 869-879. Nov., 1925.

The author describes "the first of a series of experiments in growing seedlings of coniferous trees under artificial light for the primary purpose of establishing the extent of difference between species, if any exists, with respect to so-called 'tolerance of shade' or ability to grow in weak light such as is sometimes found under the forest canopy."

(127)

THE RÔLE OF LIGHT IN NATURAL AND ARTIFICIAL REFORESTATION. *Jour. Forestry* 15: 233-239. Feb., 1917.

The author discusses the importance to foresters of considering the rôle of light on a physical basis and for determining its "effective physical value in combination with the heat of the air rather than its theoretical physical value."

(128)

WINDBREAKS: THEIR INFLUENCE AND VALUE. 100 p. Washington, Govt. print. off., 1911. (*U. S. Dept. Agr., Forest Service Bul.* 86.)

The author discusses the influence of windbreaks upon the effect of various weather conditions on crop yields.

— and ROESER, JACOB, jr.

(129)

LIGHT INTENSITIES REQUIRED FOR GROWTH OF CONIFEROUS SEEDLINGS. *Amer. Jour. Bot.* 15: 185-194. Mar., 1928.

The authors describe a series of experiments centering about a group of four Rocky Mountain conifers which prove that there are wide variations in the ability of the different species to grow in weak light. "With a minimum requirement of less than three-fourths of 1 per cent and increasing its original size almost 10 times in light of 10 per cent intensity, redwood stands out as by far the most efficient mechanism for photosynthesis."

- BATES, CARLOS GLAZIER and ROESER JACOB, jr.—Continued. (130)
RELATIVE RESISTANCE OF TREE SEEDLINGS TO EXCESSIVE HEAT. 16 p. Wash-
ington, D. C., 1924. (U. S. Dept. Agr. Bul. 1263.)
Douglas fir seedlings were found to be most sensitive to high tem-
peratures.
- BAUMAN, E. (131)
ÜBER DEN ZUSAMMENHANG ZWISCHEN KLIMA, BODEN, DÜNGUNG UND ERNTE.
Fortschr. Landw. 4: 551-554. 1929.
The results are given of fertilizer trials in which the influence of
weather was taken into consideration, especially heat and rainfall.
- BAUR, FRANZ. (132)
BEZIEHUNGEN ZWISCHEN NIEDERSCHLAGSMENGE UND ERNTEERTRAG IN NIEDER-
BAYERN. Met. Ztschr. 41 (6): 170-173. June, 1924.
Coefficients of correlation are established between rainfall and yield
of crops in Lower Bavaria. For wheat and rye a dry March is advan-
tageous. A dry July is very important for wheat. A dry June is
advantageous for potatoes, but harmful for oats. A rainy January is
good for winter wheat.
- BEACH, SPENCER AMBROSE, and ALLEN, F. W., jr. (133)
HARDINESS IN THE APPLE AS CORRELATED WITH STRUCTURE AND COMPOSITION.
p. 154-204. Ames, 1915. (Iowa Agr. Expt. Sta. Bul. 21.)
- BEALS, EDWARD A. (134)
FROST FORECASTS AND PROTECTION IN OREGON, WASHINGTON, AND IDAHO. U. S.
Mo. Weather Rev. 42: 587. Oct., 1914.
- BEAN, WILLIAM JACKSON. (135)
EFFECTS OF THE WINTER ON TREES AND SHRUBS AT KEW. Roy. Bot. Gard. Kew.
Bul. Misc. Inform. 6: 233-239. 1909.
An account of the damage done to trees and shrubs during the severe
winter of 1908-9. It was due not so much to "long spells of intense
cold as to violent alternations between intense cold and unseasonable
warmth."
- WOODY VEGETATION AND THE WINTER OF 1916-17. Roy. Bot. Gard. Kew.
Bul. Misc. Inform. 6: 237-239. 1917. (136)
- BEAUVERIE, JEAN. (137)
INFLUENCE DE LA HAUTEUR D'EAU MÉTÉORIQUE PENDANT LA "PÉRIODE CRITIQUE"
DU BLÉ SUR LE RENDEMENT. Compt. Rend. Acad. Sci. [Paris] 176: 707-709.
Mar. 5, 1923.
The effect of rainfall on wheat yield during the critical period of
growth is traced for the period of 1901-1922. (138)
- ON THE DEVELOPMENT OF WHEAT RUSTS IN RELATION TO CLIMATIC CONDITIONS.
Internatl. Conf. Phytopath. and Econ. Ent. Netherlands, Rpt., 1923: 201-
203.
An abstract of a paper giving results of investigations made in 1921
and 1922 on about 50 strains of wheat. The influence of rainfall is
discussed. (139)
- LA ROUILLE JAUNE DU BLÉ. Compt. Rend. Acad. Sci. [Paris]. 177: 969-971.
Nov. 12, 1923.
The effect of temperature and rainfall on yellow rust of wheat is
noted. (140)
- SUR L'ADAPTATION XÉROPHILE DES EUPHORBES PARASITÉES PAR DES ROUILLES.
Compt. Rend. Soc. Biol. [Paris] 84: 401-403. Feb. 21, 1921.
Discusses the effect of humidity and drought on Euphorbia rusts. (141)
- SUR LE COMPORTEMENT DES DIVERSES ROUILLES DU BLÉ AVEC LE CLIMAT. Off.
Régional Agr. Massif Central France, Bul. 2: 116-119. 1921.
The effect of the weather of 1921 and 1922 on wheat rust is noted. (142)
- SUR LES RAPPORTS EXISTANT ENTRE LE DÉVELOPPEMENT DES ROUILLES DU BLÉ
ET LE CLIMAT. Compt. Rend Acad. Sci. [Paris] 176: 529-531. Feb. 19,
1923.
The effect of rainfall on wheat rust is briefly noted. (143)
- BECK, WILLIAM A. (143)
THE EFFECT OF DROUGHT ON THE OSMOTIC VALUE OF PLANT TISSUES. Proto-
plasma 8 (1): 70-126. Oct., 1929.

BECQUEREL, PAUL

(144)

ACTION DE L'AIR LIQUIDE SUR LA VIE DE LA GRAINE. Compt. Rend. Acad. Sci. [Paris] 104: 1652-1654. Jan.-June, 1905.

The conclusion is drawn from experiments made on several kinds of seeds that their resistance to low temperatures depends entirely on the quantity of water and gas in their tissues. If the protoplasm has attained by desiccation its maximum of concentration and its minimum of activity, it does not freeze, and the seed retains its power of germination.

BELLAIR, GEORGES.

(145)

LA LUMIÈRE DANS LA VIE VÉGÉTALE. Rev. Hort. 99 (14): 351-352. Feb. 16, 1927.

A brief study of the effect of light on plant life.

(146)

OBSERVATIONS SUR LA RÉSISTANCE DE QUELQUES VARIÉTÉS DE POMMES DE TERRE À LA SÉCHERESSE. Jour. Soc. Nat. Hort. France (4) 23: 197-199. May, 1922.

Drought resistance of several varieties of potatoes is discussed.

BELYEA, HAROLD CAHILL.

(147)

WIND AND EXPOSURE AS LIMITING FACTORS IN THE ESTABLISHMENT OF FOREST PLANTATIONS. Ecology 6: 238-240. July, 1925.

The author studies the influence of wind as affecting the ability of tree growth to establish itself in certain regions.

— and MACALONEY, HARVEY J.

(148)

WEATHER INJURY TO TERMINAL BUDS OF SCOTCH PINE AND OTHER CONIFERS. Jour. Forestry 24: 685-690. Oct., 1926.

"Frost injury, that is injury of the cellular structure of the live bud tissue due to freezing, may occur in several coniferous native and exotic species planted in central and western New York, following certain fairly well-defined climatic conditions. This injury seems most excessive in Scotch pine, affecting from 60 to 70 per cent of the trees . . . The climatic conditions which cause this injury seem to be an early and continued series of fine warm days of sufficient intensity to induce growth in the apical buds, followed by a drop to freezing temperatures, which in turn is followed by a return to high temperatures. The duration of the freezing period is not of as much importance as its intensity."

BENEDICT, RALPH CURTISS.

(149)

SNOW INJURY TO TREES. Torreya 16 (3): 71-72. Mar., 1916.

BENNETT, WALTER J.

(150)

FROST HAZARDS IN FLORIDA. COLD WEATHER IS IMPORTANT TO FLORIDA FARMERS BECAUSE THEY HAVE SO LITTLE OF IT. Fla. Grower 32 (23): 3-4. Dec. 5, 1925.

BENTLEY, MAX.

(151)

THE CONFLICT ON THE TEXAS PLAIN, WHERE THE AGE-OLD CONTEST BETWEEN TREES AND DROUGHT RAGES SILENTLY AND RELENTLESSLY. Amer. Forests and Forest Life 30: 517-520, 542. Sept., 1924.

BENZIN, V. M.

(152)

THE NOTES ON MY TURKESTAN TRIP. Bul. Angew. Bot. 6: 491-495. July, 1913.

In Russian, with English summary, p. 491-495.

A brief description of drought-resistant wheat and rye found in Turkestan.

(153)

[STUDY OF DROUGHT RESISTANT STRAINS OF FIELD CROPS. 1. DROUGHT RESISTANT PLANTS. 2. GRASSES AND FORAGE PLANTS] 39 p. St. Petersburg, 1913. In Russian.

BERGANN, FRIEDRICH.

(154)

UNTERSUCHUNGEN ÜBER LICHTWACHSTUM, LICHTKRÜMMUNG UND LICHTABFALL BEI AVENA SATIVA MIT HILFE MONOCHROMATISCHEN LICHTES. Planta Arch. Wiss. Bot. 10: 666-743. May 20, 1930.

A study of the effect of light on the oat.

BERGEN, JOSEPH YOUNG.

(155)

THE DWARFING EFFECT OF TREES UPON NEIGHBORING PLANTS. Bot. Gaz. 60: 491-492. Dec., 1915.

Cases in which fruit fails to mature may depend upon partial exclusion of light due to the proximity of trees.

- BERGEN, JOSEPH YOUNG—Continued. (156)
 THE LIGHT REQUIREMENT OF PLANTS. *Plant World* 12: 201-205. Aug., 1909.
 Sums up and comments on some of Wiesner's findings in his *Lichtgenuss der Pflanzen*.
- BERGMAN, H. F. (157)
 THE RESPIRATORY ACTIVITY OF VARIOUS PARTS OF THE CRANBERRY PLANT IN RELATION TO FLOODING INJURY. *Amer. Jour. Bot.* 12: 641-659. Dec., 1925.
 The relation of temperature, light, and wind to flooding injury is discussed.
- BERKNER. (158)
 DER EINFLUSS DER JAHRESWITTERUNG AUF HÖHE UND GÜTE DER ERTRÄGE UNSERER FELDFRÜCHTE. *Illus. Landw. Ztg.* 42 (65/66): 267-269; (67/68): 276-277. Aug., 1922.
 The author points out the dependence of crops upon weather factors at each stage of development.
- BERNARD, CH. (159)
 DIE DOOR DE VORST OP DE PENGALENGANSCH E HOOGVLAKTE VEROORZ AAKTE SCHADE. *Dutch East Indies Meded. Proefsta. Thee.* no. 38, 11 p. 1915.
 Abstract in *Internatl. Rev. Sci. and Pract. Agr.* Year 7, no. 12, p. 1848. Dec., 1916.
 The writer describes the effect of frost on tea and quinine plants in Java and suggests methods of prevention.
- BERNBECK, OSKAR E. G. (160)
 DER WIND ALS PFLANZENPATHOLOGISCHER FAKTOR. 116 p. Stuttgart, 1907. (Inaug.-Diss. Bonn.)
 A study of the effect of wind on plants.
- WIND UND PFLANZE. *Flora* 117: 293-300. 1924. (161)
 The author discusses the effect of wind on plants.
- WIND UND PFLANZE. *Tharandt Forstl. Jahrb.* 71 (3): 130-156; (4): 157-193. 1920. (162)
 Wind and its influence on plant life is studied.
- WIND UND PFLANZENWACHSTUM. *Forstwiss. Centbl.* 33: 210-211. 1911. (163)
 A brief account of the effect of wind on plant growth.
- BERTHOLD. (164)
 ÜBERERFRIEREN UND KÄLTETOD DER PFLANZEN. *Beitr. Pflanzenzucht* 5: 71-78. 1922.
 The effect of frost on plants is studied.
- BERTONI, MOISÈS S. (165)
 LÍMITES DE RESISTENCIA DE LAS PLANTAS TROPICALES Y SUBTROPICALES A LAS BAJAS TEMPERATURAS. *An. Cient. Paraguay*, ser. 2, no. 5, p. 324-344. July, 1919.
 The author demonstrates the falsity of the belief that tropical plants can not endure low temperatures.
- BERTRAND, GABRIEL. (166)
 LA CONCENTRATION DU SUC CELLULAIRE ET LA RÉSISTANCE DES PLANTES À LA GELÉE. *Compt. Rend. Acad. Agr. France* 15: 569-571. May 1, 1929.
 Attention is called to one of the causes of cold resistance of plants.
- BESTERO, D. C. DE, and DURAND, MICHEL. (167)
 INFLUENCE DE LA LUMIÈRE SUR L'ABSORPTION DES MATIÈRES ORGANIQUES DU SOL PAR LES PLANTES. *Compt. Rend. Acad. Sci. [Paris]* 168: 467-470. Mar. 3, 1919.
 Experiments made with the pea plant show that lack of light affects its assimilation of chlorophyll and that there is neither parallelism nor compensation between the absorption of carbon by the green leaves and the absorption of organic carbon by the roots.
- BEVERIDGE, SIR WILLIAM H. (168)
 BRITISH EXPORTS AND THE BAROMETER. I-II. *Econ. Jour.* 30 (117): 13-25; (118): 209-213. 1920.
 The author calls attention to "certain regular fluctuations discoverable in the statistics of British exports and their apparent connection with variations of barometric pressure and harvests."
- WEATHER AND HARVEST CYCLES. *Econ. Jour.* 31 (124): 429-452. Dec., 1921. (169)
 A study of the yearly fluctuation of wheat prices in Western and

BEVERIDGE, SIR WILLIAM H.—Continued.

Central Europe from 1500 to 1869 would seem to indicate the influence of a 15.3-year weather cycle.

(170)

WHEAT PRICES AND RAINFALL IN WESTERN EUROPE. Jour. Roy. Statist. Soc. S5 (pt. 3): 412-459. May, 1922.

This paper is a sequel and supplement to the author's article entitled "Weather and Harvest Cycles," published in the Economic Journal for December, 1921. By applying harmonic analysis to European wheat prices for three centuries he has found evidence of many weather cycles. "Somewhere or other in the solar system there are periodic movements affecting our weather and crops, 10 or 20 or more in number, far more regular than had ever been believed, possibly approaching in some cases the regularity and persistence of free orbital motion, subject in other cases to sudden birth and death. These movements may be of one type, or of several types; they may be in the sun or the planets or the moon, in the earth or in the air or water upon its surface."

The paper, which was read at a meeting of the Royal Statistical Society on Apr. 25, 1922, was discussed by Mr. G. Udny Yule, Sir Napier Shaw, Mr. A. W. Flux, Sir Thomas Middleton, and others.

BEWLEY, W. F. (171)

THE INFLUENCE OF BRIGHT SUNSHINE UPON THE TOMATO UNDER GLASS. Ann. Appl. Biol. 16: 281-287. May, 1929.

"The yield per acre varies directly in relation to the total hours of bright sunshine during the period April 1 to September 30. Total sunshine also affects the potash requirement of the tomato, less potash being required during bright sunny weather than under dull conditions."

(172)

"SLEEPY DISEASE" OF THE TOMATO. Ann. Appl. Biol. 9: 116-134. June, 1922.

The conditions of temperature and light favorable to the fungi causing this disease are discussed.

BEWS, JOHN W., and AITKEN, R. D. (173)

THE MEASUREMENT OF LIGHT INTENSITY IN SOUTH AFRICA, WITH SPECIAL REFERENCE TO PLANT HABITATS. So. Africa Bot. Survey Mem. 5: 33-44. 1923.

"The effects of altitude, slope, and exposure are illustrated."

BEYER, ADOLF. (174)

ÜBER DIE LICHTWACHSTUMSREAKTION APOPHOTOTROPISCHER AVENAKOLEOPTILEN. (EIN BEITRAG ZUR PRÜFUNG DER BLAAUWACHEN THEORIE DES PHOTOTROPISMUS.) Planta Arch. Wiss. Bot. 2 (2-3): 367-372. 1926.

The reaction to light of the oat coleoptile is studied. The author's conclusion does not agree with that of Blaauw.

BIELOV, C. A. (175)

INFLUENCE OF TEMPERATURE AND MOISTURE ON THE GROWTH OF MILLET. Trudy Prikl. Bot. i Selekt. (Bul. Appl. Bot. and Plant Breeding) 9: 333-352. 1916.

In Russian. Abstract in Internatl. Rev. Sci. and Pract. Agr. 8: 1093-1094. Aug., 1917.

BIJHOUWER, J. (176)

DE PERIODICITEIT VAN DE KNOPONTWIKKELING BIJ DEN APPEL. Meded. Landbouwhoogesl. Lab. Planten-Physiol. [Wageningen.] No. 9, 63 p. 1924.

English summary. p. 48-54.

"Periodicity of the bud-development of the apple."

BIRMINGHAM, W. A. (177)

FROST BLISTER OF VEGETABLES. Agr. Gaz. N. S. Wales 37 (pt. 4): 319-322. Apr. 1, 1926.

A brief account of frost blister on celery. "The same condition [was] found in beet, broadbeans, and rhubarb."

BISBY, G. R. (178)

STUDIES ON FUSARIUM DISEASES OF POTATOES AND TRUCK CROPS IN MINNESOTA. 58 p. University Farm, St. Paul, 1919 (Minn. Agr. Expt. Sta. Bul. 181.)

The relation of precipitation, temperature, and light to the disease is discussed.

- BLAAUW, A. H. (179)
 LICHT UND WACHSTUM. *Ztschr. Bot.* 6: 641-703. 1914; 7: 465-532. 1915.
 A study of the influence of light on plant growth.
- BLACK, W. R. (180)
 METEOROLOGY AND AGRICULTURE. *Jour. Min. Agr. [Gt. Brit.]* 33: 321-331.
 July, 1926.
 A brief general discussion of the subject and an outline of the British agricultural meteorological scheme.
- BLACKMAN, F. F. (181)
 OPTIMA AND LIMITING FACTORS. *Ann. Bot. [London]* 19: 281-295. Apr., 1905.
 "In the case of growth, besides the more subtle factors, there are two fairly obvious factors which must, each in its turn, and under different conditions, play the part of a limiting factor."
- (182)
 VEGETATION AND FROST. *New Phytol.* 8: 354-362. Nov. and Dec., 1909.
 The author discusses "the present state of our knowledge" with regard to "the relation of plant-vitality to such low temperatures as occur normally in the winter months."
- and MATTHAEI. (183)
 EXPERIMENTAL RESEARCHES IN VEGETABLE ASSIMILATION AND RESPIRATION.
 IV. A QUANTITATIVE STUDY OF CARBON-DIOXIDE ASSIMILATION AND LEAF-TEMPERATURE IN NATURAL ILLUMINATION. *Roy. Soc. [London] Proc., Ser. B.* 76: 402-460. 1905.
 "The general views expressed in this paper involve the assumption that with all intensities of light the amount of assimilation is proportional to the intensity of the light unless some secondary or limiting factor is at work."
- BLACKMAN, V. H. (184)
 SUNLIGHT, THE PLANT, AND CROP EFFICIENCY. *Essex Co. Farmer's Union Yearbook* 1927: 283-289. Reprinted in [*Gt. Brit.*] *Min. Agr. and Fisheries, Mo. Crop Weather Rpts. v. 3, no. 6.* Mar., 1927.
 The relation of sunlight to the producing power of plants is discussed.
- BLAIR, THOMAS A. (185)
 THE MATHEMATICIAN, THE FARMER, AND THE WEATHER. *Sci. Mo.* 11: 353-361.
 Oct., 1920.
 The author discusses the application of mathematics to the study of the relation of weather to crops as illustrated by the studies of J. Warren Smith and others in connection with corn, wheat, potatoes, and cotton.
- (186)
 PARTIAL CORRELATION APPLIED TO DAKOTA DATA ON WEATHER AND WHEAT YIELD. *U. S. Mo. Weather Rev.* 46: 71-73. Feb., 1918.
 "A considerable part of the apparent effect of either precipitation or temperature upon yield [of wheat in the Dakotas] is really due to the accompanying effect of the other." Tables are given showing correlation between the rainfall of May and June, the temperature of June, and the yield per acre of spring wheat in North Dakota from 1892-1917, also between the rainfall of May and June, the temperature of June, and the yield of spring wheat per acre in South Dakota from 1891-1917.
- (187)
 RAINFALL AND SPRING WHEAT. *U. S. Mo. Weather Rev.* 41: 1515-1517. Oct., 1913.
 The author gives tables which "seem to confirm the idea that the total precipitation of May and June is in most years the largest factor in determining the wheat yield in the two Dakotas, but not in Minnesota."
- (188)
 A STATISTICAL STUDY OF WEATHER FACTORS AFFECTING THE YIELD OF WINTER WHEAT IN OHIO. *U. S. Mo. Weather Rev.* 47: 841-847. 1919.
 The author presents proof of a direct relation between the yield of winter wheat in Ohio and the temperature and precipitation values at certain stages in the growth of the plant.
- (189)
 TEMPERATURE AND SPRING WHEAT IN THE DAKOTAS. *U. S. Mo. Weather Rev.* 43: 24-26. Jan., 1915.
 "Considering only calendar months, the rainfall of May and June and the mean temperature of June are the important weather factors, and they are of about equal importance, affecting the wheat crop of the Dakotas."

- BLAKE, A. L., and others. (190)
 A NEW FACTOR IN THE DETERMINATION OF THE HARDINESS OF THE APPLE.
 Amer. Soc. Hort. Sci. Proc. 1920: 279-289.
 "It is found that the time of the season is the important consideration
 in determinations of hardness."
- BLAKE, MAURICE A. (191)
 APPLES ARE INJURED BY SEVERE DROUGHT. MARKED DIFFERENCES IN VARIETAL
 RESISTANCE. N. J. State Hort. Soc. News 6 (3): 132. Nov., 1925.
 A brief account of the effect of drought on apples in New Jersey in 1925.
- (192)
 FACTORS WHICH DETERMINE COLOR AND SIZE OF PEACHES. Amer. Soc. Hort.
 Sci. Proc. 1913: 83-88.
 The author shows that the high color of peaches is largely determined
 by sunlight. The effect of winter injuries on the growth of peaches is
 also briefly discussed.
- (193)
 FACTORS WHICH INFLUENCE THE BLOOMING AND RIPENING PERIOD OF PEACHES.
 Amer. Soc. Hort. Sci. Proc. 1911: 95-100.
 The influence of weather factors on the time of blooming and ripening
 of peaches is briefly indicated.
- (194)
 WINTER INJURIES TO FRUIT TREES. N. J. State Hort. Soc. Proc. Ann. Sess.
 44: 106-110. 1918.
- (195)
 WINTER INJURY TO FRUIT TREES IN NEW JERSEY. Amer. Soc. Hort. Sci. Proc.
 1918: 24-25.
- BLANC, LÉON. (196)
 RECHERCHES EXPERIMENTALES SUR L'INFLUENCE DES VARIATIONS DE TEMPÉRA-
 TURE SUR LA RESPIRATION DES PLANTES. Rev. Gén. Bot. 28: 65-79. Mar.
 15, 1916.
 It is shown that sudden variations of temperature do not affect plant
 respiration.
- BLIN, HENRI. (197)
 LES SAISONS PLUVIEUSES ET LE RENDEMENT DU BLÉ. Jour. Agr. Prat. (n. s.)
 48: 158-159. Aug. 20, 1927.
 The influence of rainfall on wheat yield is discussed.
- BLISH, M. J. (198)
 EFFECT OF PREMATURE FREEZING ON COMPOSITION OF WHEAT. Jour. Agr.
 Research 19: 181-188. May 15, 1920.
 The author presents the results of an investigation showing that
 "premature freezing affects the chemical composition of wheat and the
 flour milled therefrom."
- BLISS, GEORGE S. (199)
 FORECASTING MINIMUM TEMPERATURES FOR THE CRANBERRY BOGS OF NEW
 JERSEY. U. S. Mo. Weather Rev. 50: 529-533. Oct., 1922.
 Discusses the forecasting of minimum temperatures for the cranberry
 bogs of New Jersey by means of a hygrometric formula.
- (200)
 FROST ON THE CRANBERRY BOGS OF NEW JERSEY. U. S. Mo. Weather Rev.
 52: 212-214. Apr., 1924.
 Discusses steps taken to establish a radiation formula for use in
 forecasting bog minimum temperatures in New Jersey.
- BLODGETT, FOREST M. (201)
 THE RELATION OF TIME AND TEMPERATURE TO THE KILLING OF POTATOES AND
 POTATO MOSAIC VIRUS. (Abstract) Phytopathology 12: 40. Jan., 1922.
 Abstract of a paper presented at the thirteenth annual meeting of the
 American Phytopathological Society, Toronto, Canada, Dec. 28-31, 1921.
- (202)
 TOBACCO MOSAIC ON POTATOES. Phytopathology 17: 727-734. Oct., 1927.
 "Marked symptoms were obtained only at relatively high temperatures,
 about 26° C. and above. No symptoms could be detected in young plants
 at temperatures from 15° to 18° C."
- BLODGETT, FREDERICK H. (203)
 RELATION BETWEEN STORM AND DISEASE, AUGUST AND SEPTEMBER, 1915, IN
 TEXAS. (Abstract) Phytopathology 6: 100-101. Feb., 1916.
 Abstract of a paper presented at the seventh annual meeting of the
 American Phytopathological Society, Columbus, Ohio, Dec. 28-31, 1915.

BLODGETT, FREDERICK H.—Continued.

An account of the effect of heavy rainfall and high wind on the cotton crop in Texas. (204)

WEATHER CONDITIONS AND CROP DISEASES IN TEXAS. Mem. Torrey Bot. Club 17: 74-78. 1917. (205)

BLUMER, JACOB C. SOME EFFECTS OF FROST IN THE SOUTHWEST. Torrey 8 (2): 25-26, Feb., 1908. (206)

BOBKO, EUGEN W., and POPOWA, R. A. BEITRÄGE ZUR FRAGE ÜBER DIE DÜRRE UND KÄLTERESISTENZ DER PFLANZEN. Ztschr. Pflanzenernähr. Düngung A. Wiss. Teil 14 (1-2): 24-37. 1929. (207)

A study of drought and cold resistance of plants. BÖHMER, KARL. DIE BEDEUTUNG DER SAMENTEILE FÜR DIE LICHTWIRKUNG UND DIE WECHSEL-BEZIEHUNG VON LICHT UND SAUERSTOFF BEI DER KEIMUNG LICHTEMPTIND-LICHER SAMEN. Jahrb. Wiss. Bot. 68: 549-601. May, 1928. (208)

A phase of the influence of light on seed germination is studied. BÖNING, KARL. KRANKHEITEN, SCHÄDLINGE UND WITTERUNGSSCHÄDEN AM TABAK IM JAHRE 1929. Prakt. Bl. Bayer. Landesanst. Pflanzenbau u. Schutz 8 (2): 27-33. May, 1930. (209)

Some effects of weather conditions, and particularly of drought, on tobacco are indicated. ÜBER FROSTBESCHÄDIGUNGEN AN DEN BLÄTTERN DER ACKERBOHNE. Prakt. Bl. Bayer. Landesanst. Pflanzenbau u. Schutz (n. s.) 5 (6): 127-130. Sept. 1927. (210)

A brief account of frost damage to leaves of *Vicia faba*. BÖRNSTEIN, RICHARD. WETTERKUNDE UND LANDWIRTSCHAFT. Deut. Landw. Presse 28 (5): 31-32; (7): 45. Jan., 1901. (211)

A general discussion of the subject. BOEUF. LE MITADINAGE DES BLÉS DURS. Bul. Agr. Algérie-Tunisie-Maroc (2), 35 (2): 25-26. 1929. (212)

Abstract in Internatl. Rev. Agr. pt. 1, Mo. Bul. Agri. Sci. and Pract. 21 (1): 8. Jan., 1930. (212a)

Not seen. "The writer considers that . . . partial hardening of the grain is produced when the maturation period is prolonged by an abnormally moist state of the soil and atmosphere. The industrial value of the grain is lowered, but not its value as seed."

BOGDANOFF, P. L. ERGEBNISSE DER AKKLIMATISATION EINIGER NADELHOLZARTEN IN DER AKKLIMATISATIONSSCHAULE DES BOTANISCHEN HAUPTGARTENS IN LENINGRAD. Jard. Bot. Princ. U. R. S. S. Bul. t. 26, livr. 5, p. 423-443. 1927. (213)

In Russian with German summary. The results are given of an investigation of the effect of weather conditions on the growth of coniferous trees. BOGUE, A. H. THE RELATIONSHIP BETWEEN THE YIELD OF WHEAT IN THE PRAIRIE PROVINCES AND THE WEATHER. Canada Bur. Statis. Mo. Bul. Agr. Statis. 23(265): 312-317. Sept., 1930. (214)

This is a study of the relationship existing between the yield of wheat in each of the three prairie Provinces and weather factors, particularly rainfall, during the period 1914-1928. BOIS, DÉSIRÉ. DÉGÂTS CAUSÉS PAR LE FROID DANS LE MIDI DE LA FRANCE. Soc. Path. Vég. France Bul. t. 4, fasc. 1, p. 50-51. Oct., 1917. (215)

On frost damage in the south of France. BONACINA, L. C. W. CLIMATIC CONTROL. 167 p. London, A. and C. Black, 1911. (216)

The author shows that nature is rigidly under the rule of climate, as evidenced by the vegetation of a number of countries representing different parts of the world.

- BONACINA, L. C. W.—Continued. (215)
POLAR CLIMATE AND VEGETATION. *Nature* [London] 112: 436-437. Sept. 22, 1923.
"In the Arctic lands . . . the intensity of diffuse daylight is relatively great, and there can be no doubt that this factor is all-important in permitting vegetation to push much farther north than would be the case if light were not able to some extent to replace warmth in the economy of plants during the Arctic summer."
- BONNETT, W. E. (215a)
FROST FIGHTING IN CALIFORNIA VINEYARDS. *U. S. Mo. Weather Rev.* 39: 611-612. 1911.
- BONNIER, GASTON. (216)
NOUVELLES OBSERVATIONS SUR LES CULTURES EXPÉRIMENTALES AUX DIVERSES ALTITUDES. *Rev. Gén. Bot.* 32: 305-326. Aug. 15, 1920.
The author gives the results of a study of the effect of varying altitudes on the germination of seeds and the growth of plants.
- BOODLE, L. A. (217)
THE SCORCHING OF FOLIAGE BY SEA-WINDS. *Jour. Min. Agr. [Gt. Brit.]* 27: 479-486. Aug., 1920.
"The general conclusion . . . is that the scorching of foliage by sea-winds is chiefly due to the drying action of the wind, but that salt may perhaps occasionally contribute toward the production of an injurious effect."
- BOOTH, ERNEST G. (218)
DAILY GROWTH OF THE OAT KERNEL AND EFFECT ON GERMINATION OF IMMATURITY AND CONTROLLED LOW TEMPERATURES. 42 p. University Farm. St. Paul, 1929. (*Minn. Agr. Expt. Sta. Tech. Bul.* 62.)
A study of the effect of freezing temperatures on oat germination, in which consideration is given to the actual temperatures and to the duration of exposure to low temperatures.
- BORESCH, KARL. (219)
PHOTOKATALYSEN IN PFLANZEN. *Naturwissenschaften* 10: 505-512. June 2, 1922.
The chemical reaction of plants to light is studied.
- BORTHWICK, A. W. (220)
FROST CANKER OF PICEA SITCHENSIS. (TRAUTV. ET MEY), THE MENZIES SPRUCE. *Edinburgh Roy. Bot. Gard. Notes* 4: 263-265. Mar., 1909.
- BORTHWICK, H. A., and ROBBINS, W. W. (221)
LETTUCE SEED AND ITS GERMINATION. *Hilgardia* 3: 275-305. May, 1928.
"The requirements for the germination of lettuce seed are an adequate supply of moisture, a low temperature (below 25° C.), and good aeration."
- BOS HEMMO. (222)
ZUR KRITIK DER LEHRE VON DEN THERMISCHEN VEGETATIONS-KONSTANTEN AUCH EN BEZUG AUF WINTERRUHE UND BELAUBUNGSTRIEB DER PFLANZEN. *Verhandl. Bot. Ver. Prov. Brandenburg* 48: 62-90. 1906.
A critical discussion of some theories with regard to the effect of temperature on plants.
- BOSWELL, VICTOR R. (223)
DEHYDRATION OF CERTAIN PLANT TISSUES. *Bot. Gaz.* 75: 86-94. Mar., 1923.
The results are given of an investigation made with leaves of cabbage and tomato plants to determine "the relative water-retaining capacity of the tissues of plants subjected to different treatments and of known degrees of hardness, and whether there is close correlation between the relative amounts of free and unfree water in such tissues and their rate of drying."
- (224)
THE INFLUENCE OF TEMPERATURE UPON THE GROWTH AND YIELD OF GARDEN PEAS. *Amer. Soc. Hort. Sci. Proc.* 1926: 162-168.
"Under the climatic conditions described, and for the factors studied, temperature is the most noticeable factor influencing yield and development of the garden peas."
- (225)
TEMPERATURE INFLUENCE UPON CHEMICAL COMPOSITION AND QUALITY OF PEAS (*PISUM SATIVUM*, L.). *Amer. Soc. Hort. Sci. Proc.* 1928: 21-26.
"Late maturity resulting from late planting of Alaska peas does not result in an inherently lower quality of product if the crop is harvested

BOSWELL, VICTOR R.—Continued.

at the evidently proper stage of maturity. The low quality product often secured from late-maturity plantings is probably the result of such a rapid rate of maturity under high temperature conditions that the crop can not be (or is not) harvested at the stage at which it should be."

BOUGET, JOSEPH. (226)

DE L'INFLUENCE DES NEIGES SUR LA RÉPARTITION DES DIFFÉRENTS VÉGÉTAUX À MÊME ALTITUDE DANS LES ZONES ÉLEVÉES DES PYRÉNÉES. *Rev. Gén. Bot.* 30: 305-320. Oct. 15, 1918.

The distribution of vegetations in the mountainous regions of the Pyrenees is strongly influenced by the duration of the snow.

— and VIRVILLE, A. D. DE. (227)

INFLUENCE DE LA MÉTÉOROLOGIE DE L'ANNÉE 1921 SUR LE ROUGISSEMENT ET LA CHUTE DES FEUILLES. *Compt. Rend. Acad. Sci. [Paris]* 174:768-770. Mar. 13, 1922.

It is shown that the high temperature and prolonged dryness of 1921 had a pronounced effect upon the coloration and the fall of leaves.

BOUYGUES, H. (228)

NOUVELLE DÉMONSTRATION EXPÉRIMENTALE DE L'INFLUENCE DE LA TEMPÉRATURE SUR LE DÉVELOPPEMENT DE LA CHLOROPHYLLE. *Actes Soc. Linn. (Bordeaux)* 77: 42-45. 1925.

A study of the influence of temperature on the development of chlorophyll.

BOVIE, W. T. (229)

EFFECT OF SUNLIGHT ON GROWTH AND DEVELOPMENT. *Sci. Mo.* 21:70-89. July, 1925. Abstract in *Bot. Abs.* 15:800. June, 1926.

"Results of experiments with plants indicate that light produces a photochemical product. Only the tip of a seedling is sensitive . . . Excess light may retard growth and increase differentiation, resulting in monsters . . . Normal growth of plants depends on ultra-violet rays as well as upon heat energy."—A. M. Taylor.

BOWLES, E. A. (230)

THE EFFECT OF THE FROSTS OF THE WINTER OF 1916-17 ON VEGETATION. *Jour. Roy. Hort. Soc.* 43 (pt. 2-3):388-461. Feb., 1919.

This is an account of the effect of the exceptionally cold weather of 1916-17 on various plants in different localities.

BOYSEN, JENSEN P. (231)

STUDIES ON THE PRODUCTION OF MATTER IN LIGHT-AND-SHADOW PLANTS. *Bot. Tidsskr.* 36: 219-259. 1918.

The author's problem is to ascertain how much organic matter certain plants of different types can produce per unit of time. The effect of light is given special consideration.

BRAAK, C. (232)

VOORSPELLING VAN DE AARDAPPELZIEKTE IN VERBAND MET METEOROLOGISCHE FACTOREN. *Landbouwk. Tijdschr.* 40: 628-630. Nov., 1928.

A brief account of the effect of temperature and wind on potato blight.

BRACKETT, F. S., and WULF, O. R. (233)

LIGHT-WAVE LENGTHS YIELD INFORMATION IMPORTANT TO FARMER. *U. S. Dept. Agr. Yearbook*, 1930: 352-353.

Attention is called to the necessity of further investigation of "the quantitative relationship of light wave lengths (color) and intensity (brightness) to the various complicated processes of plant growth and metabolism, involving not only vegetative development, but also flower and seed formation."

BRADFORD, FREDERICK C. (234)

CERTAIN ASPECTS OF WINTER INJURY. *Mich. State Hort. Soc. Ann. Rpt.* 1925: 77-80.

— (235)

RELATION OF TEMPERATURE TO BLOSSOMING IN THE APPLE AND THE PEACH. 51 p. Columbia, 1922. (*Missouri Agr. Expt. Sta. Research Bul.* 53.)

Correlation between heat accumulation and date of blossoming is shown for apple and peach trees.

— (236)

WINTER INJURY OF FRUIT IN MISSOURI. 7 p. Columbia, 1922. (*Missouri Agr. Expt. Sta. Circ.* 107.)

- BRADFORD, FREDERICK C.—Continued. (237)
 WINTER INJURY TO FRUIT TREES IN MICHIGAN. Mass. Fruit Growers Assoc.
 Rpt. Ann. Meeting 33:194-200. 1927.
- and CARDINELL, H. A. (238)
 EIGHTY WINTERS IN MICHIGAN ORCHARDS. 103 p. East Lansing, 1926.
 (Mich. Agr. Expt. Sta. Special Bul. 149.)
 Winter injury and the influence of rainfall and temperature on fruit
 trees in Michigan are studied.
- and CARDINELL, H. A. (239)
 OBSERVATIONS ON WINTER INJURY. 26 p. Columbia, 1922. (Missouri Agr.
 Expt. Sta. Bul. 56.)
 Winter injury to fruit trees is discussed.
- BRANAS, M. (240)
 QUELQUES EFFETS CURIEUX DE LA GELÉE DU 24 AVRIL 1928. Prog. Agr. et
 Vitic. 91 (2): 34-40. Jan. 13, 1929; (8): 185-192. Feb. 24, 1929.
- BRAND, CHARLES JOHN, and WALDRON, L. R. (241)
 COLD RESISTANCE OF ALFALFA AND SOME FACTS INFLUENCING IT. 70 p. Wash-
 ington, Govt. Print. Off., 1910. (U. S. Dept. Agr., Bur. Plant Indus.
 Bul. 185.)
 The weather conditions that appear to be most destructive to alfalfa
 are a lack of sufficient snowfall or the exposure of plants due to drifting
 successive thawing and freezing, and an excess of moisture in the autumn.
- BRANDENBURG, FREDERICK H. (241a)
 TEMPERATURES INJURIOUS TO PEACHES, APPLES, AND PEARS IN VARIOUS STAGES
 OF DEVELOPMENT. U. S. Mo. Weather Rev. 40: 426. 1912.
 Tables are given showing at what temperature smudging is necessary
 in the various stages of development of peach, apple, and pear buds.
- BRAUN, K. (242)
 BEITRÄGE ZUR KENNTNIS DER BLATTFLECKEN AN SISALAGAVEN. Pflanze 10:
 188-197. Apr., 1914.
 It is shown that high temperatures cause a leaf-spot disease of sisal.
- BRAUNER, LEO. (243)
 LICHTKRÜMMUNG UND LICHTWACHSTUMREAKTION. Ztschr. Bot. 14: 497-547.
 1922.
 A study of Blaauw's theory of the reaction of plant growth to light.
- (244)
 ÜBER DEN EINFLUSS DER TEMPERATUR AUF DIE PHOTOTROPISCHE VARIATIONS-
 BEWEGUNG VON PHASEOLUS MULTIFLORUS. EINE ERWIDERUNG AUF H. GRAD-
 MANN'S EINWÄNDE. Jahrb. Wiss. Bot. 65: 639-642. Apr., 1926.
 The influence of temperature on the phototropic movement of Phase-
 olus multiflorus is discussed.
- BRAY, WM. L. (245)
 DISTRIBUTION AND ADAPTATION OF THE VEGETATION OF TEXAS. 108 p. Austin,
 1906. (Tex. Univ. Bul. Sci. Ser. no. 10.)
 The environmental factors that affect plants are studied. Among
 them are water, including rainfall and atmospheric vapor, temperature,
 wind, and light.
- BRAZIL. MINISTERIO DA AGRICULTURA, INDUSTRIA E COMMERCIO. DIRECTORIA DE
 METEOROLOGIA. (246)
 O CAFÉ E OS FACTORES METEOROLOGICOS PELO J. DE SAMPAIO FERRAZ. 13 p. Rio
 de Janeiro, 1928.
 Rainfall and coffee production in São Paulo are discussed.
- BREAKWELL, E. (247)
 DROUGHT RESISTANT GRASSES AND FODDER PLANTS. Agr. Gaz. N. S. Wales 25:
 385-386. May 2, 1914.
- BREMEKAMP, CORNELIS E. B. (248)
 FURTHER RESEARCHES ON THE ANTIPHOTOTROPIC CURVATURES OCCURRING IN THE
 COLEOPTILES OF AVENA. K. Akad. Wetensch. Amsterdam, Proc. Sect. Sci.
 25 (5-6): 158-165. 1923.
- (249)
 ON ANTI-PHOTOTROPIC CURVATURES OCCURRING IN THE COLEOPTILES OF AVENA.
 K. Akad. Wetensch. Amsterdam, Proc. Sect. Sci. 24 (4-6): 177-184. 1922.
- BREMER, A. H. (250)
 HOVUDSALAT (LACTUCA SATIVA CAPITATA) I DRIVBENK OG PÅ FRILAND. [CAB-
 BAGE LETTUCE IN FRAMES AND OPEN GROUND.] Meld. Norges Landbr. Høis-
 kole 9 (1-2): 1-39. 1929.

BREMER, A. H.—Continued.

The author discusses the influence of length of day and of temperature on the growth of cabbage lettuce.

(251)

OPSPIRING AV HAGEFRØ UNDER ULIKE TEMPERATURER. Nord. Jordbrugsforsk. Hft. 5-6A, p. 377-390. 1927.

The effect of temperature on pasture is studied.

(252)

[TEMPERATURE AND PLANT GROWTH. 1. GROWING RADISHES UNDER DIFFERENT TEMPERATURES.] Meld. Norges Landbr. Høiskole 8: 267-287. 1928.

Not examined. Abstract in Rev. Appl. Mycol. 7 (pt. 4): 264. 1928.

The formation of the radish depends on a certain correlation between temperature and light (intensity of light and light of day).

BREMER, HANS.

(253)

APFELSCHORFJAHERE UND WETTER. Deut. Obst-u. Gemüsebau Ztg. 70 (12): 96-97. Mar. 20, 1924.

The effect of weather conditions on apple scab is indicated.

(254)

DAS AUFTRETEN DER SCHORFKRANKHEIT AM APFELBAUM IN SEINEN BEZIEHUNGEN ZUM WETTER. Angew. Bot. 6 (2): 77-97. Mar.-June, 1924.

A study of apple-tree scab over a period of 10 years shows that the most important factor in its development is rainfall, and that the critical month is May. No relation is found between temperature and apple-tree scab.

BRENCHEY, WINIFRED E.

(255)

ON THE RELATIONS BETWEEN GROWTH AND THE ENVIRONMENTAL CONDITIONS OF TEMPERATURE AND BRIGHT SUNSHINE. Ann. Appl. Biol. 6: 211-244. Apr., 1920.

Experiments made on pea seedlings show the influence of temperature and sunshine on the rate of growth at different periods of the life of the plant.

BREWSTER, D. R.

(256)

RELATION BETWEEN HEIGHT GROWTH OF LARCH SEEDLINGS AND WEATHER CONDITIONS. Jour. Forestry 16: 861-870. Dec., 1918.

The author reaches a "tentative" conclusion to the effect that "rate of height growth of larch seedlings does vary in accordance with variations in weather conditions from year to year, and that the most favorable conditions for rapid height growth are produced in the North Idaho region by a combination of temperatures somewhat above the average, coupled with a high percentage of clear days, with an average amount of precipitation evenly distributed in the form of good rains at intervals of four to ten days preceded and followed by lighter showers."

BRICCOLI, MICHELE.

(257)

IL CLIMA DELL'OLIVO IN ITALIA. Nuovi Ann. [Italy] Min. Agr. 5 (3-4): 333-372. Dec. 31, 1925.

Abstract in Expt. Sta. Rec. 55: 508. Abstract Number, Oct., 1926.

"Correlation of the growth of the olive with meteorological conditions to determine optimum conditions of growth and correlation of temperature and precipitation and physiographic conditions with olive culture are discussed. The effect of deficiency or excess of rainfall and temperature at different periods of growth is dealt with in some detail."

(257a)

CLIMATOLOGIA AGRARIA DEL TERRITORIO DI PERUGIA. Ann. Tec. Agr. 3: 463-524. Oct. 1, 1930.

A study of the effect of temperature, rainfall, relative humidity, barometric pressure, and wind on the development and yield of plants in Perugia. The plants studied are forage plants, wheat, maize, vines, and olives.

BRIGGS, G. E.

(258)

EXPERIMENTAL RESEARCHES ON VEGETABLE ASSIMILATION AND RESPIRATION. XIII, THE DEVELOPMENT OF PHOTOSYNTHETIC ACTIVITY DURING GERMINATION. Roy. Soc. [London]. Proc. Ser. B 91: 249-268. June 1, 1920.

"The development of a leaf begins with a phase in which it has no photosynthetic power. The development of this power is shown to lag

BRIGGS, G. E.—Continued.

behind greening, so that a young green leaf may exhibit slight or zero photosynthesis. This means that photosynthetic activity demands the development of some internal factor other than chlorophyll. The photosynthetic potentiality of this factor rapidly increases with age. day by day, whether the leaf is in the light or in the darkness, and even though there is no concurrent increase in the amount of chlorophyll."

BRIGGS, LYMAN J., and BELZ, J. O.

(259)

DRY FARMING IN RELATION TO RAINFALL AND EVAPORATION. 71 p. Washington, D. C., 1910. (U. S. Dept. Agr., Bur. Plant Indus. Bul. 188.)

This bulletin contains "a discussion of the relation of the quantity and character of the rainfall and of the evaporation to crop production under dry-farming methods in various sections of the western states."

— and SHANTZ, H. L.

(260)

DAILY TRANSPIRATION DURING THE NORMAL GROWTH PERIOD AND ITS CORRELATION WITH THE WEATHER. Jour. Agr. Research 7: 155-212. Oct. 23, 1916.

This paper gives the results of experiments made to determine the daily transpiration of 22 crops during the period of growth, and the extent to which the daily transpiration is correlated with various weather factors.

— and SHANTZ, H. L.

(261)

HOURLY TRANSPIRATION RATE ON CLEAR DAYS AS DETERMINED BY CYCLIC ENVIRONMENT FACTORS. Jour. Agr. Research 5 (14): 583-650. Jan. 3, 1916.

This paper deals with the transpiration response on clear days of wheat, oats, sorghum, rye, alfalfa, and amaranthus to solar radiation intensity, wet-bulb depression, air temperature, and wind velocity.

— and SHANTZ, H. L.

(262)

RELATIVE WATER REQUIREMENTS OF PLANTS. Jour. Agr. Research 3: 1-63. Oct. 15, 1914.

Contains the results of investigations of the rainfall requirements of plants. It is shown that there is a wide range in water requirements among the varieties of many crops which "encourages the belief that strains may yet be secured which are still more efficient in the use of water than those now grown in dry-land regions."

— and SHANTZ, H. L.

(263)

THE WATER REQUIREMENT OF PLANTS AS INFLUENCED BY ENVIRONMENT. Pan American Sci. Cong. Proc. (1915) 3: 95-107. 1917.

Among the factors studied in their influence on water requirement of plants are evaporation, humidity, and temperature.

BRIGGS, ROBERT R.

(264)

FROST PROTECTION IN ARIZONA. U. S. Mo. Weather Rev. 42: 489-590. Oct., 1914.

BRIGHT, D. N. E.

(265)

THE EFFECTS OF EXPOSURE UPON THE STRUCTURE OF CERTAIN HEATH PLANTS. Jour. Ecology 16: 323-365. Aug., 1928.

BROCK, W. S.

(266)

PEACH GROWING IN ILLINOIS AS MODIFIED BY WINTER TEMPERATURES. Ill. Hort. 14 (2): 2-3. June 10, 1925; also in Ill. State Hort. Soc. Rpt. 1925: 272-275.

BROCKMAN-JEROSCH, HEINRICH.

(267)

BAUMGRENZE UND KLIMACHARAKTER. In Pflanzengeographische Kommission der Schweizerischen Naturforschenden Gesellschaft. Beiträge zur Geobotanischen Landesaufnahme 6, 225 p. 1919.

The effect of rainfall, snow, wind, and temperature on trees in the Swiss Alps is studied. Conditions are compared with those in the Arctic and Antarctic regions.

BRODIE, FREDERICK J.

(268)

THE WEATHER OF THE PAST AGRICULTURAL YEAR. Jour. Roy. Agr. Soc. England 70: 406-414. 1909.

A study of the weather in 1908-9 confirms the result of an inquiry made by Dr. W. N. Shaw, the director of the meteorological office, which showed that "in spite of any adverse influences in the following seasons a dry autumn is succeeded almost invariably by a yield of wheat in excess of the average."

- BROOKS, C. E. P. (269)
CLIMATES OF THE BRITISH EMPIRE SUITABLE FOR THE CULTIVATION OF COTTON.
Met. Mag. [London] 55 (651): 37-39. Apr., 1920.
The essential features of a cotton-growing climate are listed with regard to temperature, rainfall, and sunshine.
- BROOKS, CHARLES. (270)
JONATHAN SPOT. (Abstract) *Phytopathology* 7: 76. Feb., 1917.
Abstract of a paper presented at the eighth annual meeting of the American Phytopathological Society, New York City, Dec. 26-30, 1916.
"The development of Jonathan Spot increases with an increase in temperature up to 20° C., but is entirely inhibited at 30° C. The disease can be readily produced in saturated air in closed moist chambers but seldom develops in a stirred air of 70 per cent or 95 per cent relative humidity."
- and COOLEY, J. S. (271)
TEMPERATURE RELATIONS OF STONE FRUIT FUNGI. *Jour. Agr. Research* 22: 451-465. Nov. 26, 1921.
The results are given of investigations with regard to the temperature responses of two fungi on sweet cherries, prunes, and peaches.
- and FISHER, D. F. (272)
SOME HIGH-TEMPERATURE EFFECTS IN APPLES: CONTRASTS IN THE TWO SIDES OF AN APPLE. *Jour. Agr. Research* 32: 1-16. Jan. 1, 1926.
This paper contains a report of the effect of certain high-temperature periods upon the apple.
- BROOKS, CHARLES F. (273)
FORECASTING THE CROPS FROM THE WEATHER. *Geogr. Rev.* 12: 305-307. Apr., 1922.
The author reviews recent contributions to the subject and concludes that "with adequate knowledge of the detailed relationship of the weather elements to the condition of crops we could modify farm practice as regards planting in order to bring a critical stage of the crop at a time most likely to have favorable weather."
- BROOUNOFF, P. (274)
CROPS AND THE WEATHER. *Canada Dept. Agr. Bul. Foreign Agr. Intel.* 6: 373-402. May, 1916.
The influence of weather conditions on oats, buckwheat, millet, wheat, rye, and potatoes is studied in connection with observations made in Russia.
- BROUNOV, P. I., ed. (275)
ANNALS OF AGRICULTURAL METEOROLOGY. *Russia Met. Būro Liĕtopisi Selsk. Khoz. Met.* no. 1, 33 p.; no. 2, 52 p.; no. 3, 19 p. 1908-9.
In Russian. Not examined. Reference given as found.
"This volume is divided into three parts dealing, respectively, with meteorology as related to the growth of (1) winter cereals (rye and wheat); (2) summer cereals (oats, barley, wheat, millet, and maize); and (3) fruits (apples, pears, apricots, cherries, gooseberries, and grapes). *Expt. Sta. Rec.* 29: 510. Abstract number. Dec. 12, 1913.
- (276)
[THE INFLUENCE OF METEOROLOGICAL CONDITIONS ON THE GROWTH AND YIELD OF OATS IN THE CHERNOZEM REGION.] *Trudy Selsk. Khoz. Met.* no. 4, I, 270 p. 1908.
In Russian. Not examined. Reference given as found. Abstract in *Expt. Sta. Rec.* 23: 117-118. Aug., 1910.
"The general conclusions which now seem to be established are that abundant precipitation (more than 100 mm., 3.94 in.), uniformly distributed throughout the period from sprouting to heading and a resulting moisture content of from 16 to 18 per cent in the soil to a depth of 25 cm. (about 10 in.), secured a high yield of both grain and straw, and that this was the controlling meteorological factor . . . As compared with precipitation, the temperature in the Chernozem region appears to be as a rule a secondary factor, although extremes of temperature may occasionally prove fatal to the yield. The mean temperature and the length of the period from seeding to heading exerted a certain influence on the yield of straw."
- BROUWER, WALTHER. (277)
DIE BEZIEHUNGEN ZWISCHEN ERNTE UND WITTERUNG IN DER LANDWIRTSCHAFT. *Landw. Jahrb.* 63 (1): 1-81. Jan., 1926.

BROUWER, WALTHER—Continued.

The effect of temperature, sunshine, and rainfall is studied, and critical periods and factors are determined in connection with rye, wheat, oats, barley, potatoes, peas, and beans.

BROWN, ADRIAN J., and WORLEY, F. P.

(278)

THE INFLUENCE OF TEMPERATURE ON THE ABSORPTION OF WATER BY SEEDS OF *HORDEUM VULGARE* IN RELATION TO THE TEMPERATURE COEFFICIENT OF CHEMICAL CHANGE. Roy. Soc. [London]. Proc. Ser. B, 85: 546-553. Oct. 11, 1912.

BROWN, MAUD A.

(279)

THE INFLUENCE OF AIR CURRENTS ON TRANSPIRATION. Iowa Acad. Sci. Proc. 17: 13-15. 1910.

This is "a brief preliminary report on experiments now under way to show the influence of air-currents on transpiration."

BROWN, W. S.

(280)

THE DECEMBER FREEZE—SOME LESSONS FROM IT. p. 9-14. Corvallis, 1921. (Oreg. Agr. Expt. Sta. Third crop pest and Hort. Rpt. 1915-1920.)

The author describes the injury done to orchard trees and small fruit plants by the severe weather of Dec., 1919.

BROWN, WILLIAM HENRY.

(281)

THE RELATION OF EVAPORATION TO WATER CONTENT OF THE SOIL AT THE TIME OF WILTING. Plant World 15: 121-134. June, 1912.

— and HEISE, GEORGE W.

(282)

THE APPLICATION OF PHOTOCHEMICAL TEMPERATURE COEFFICIENTS TO THE VELOCITY OF CARBON DIOXIDE ASSIMILATION. Philippine Jour. Sci., C. Botany 12 (1): 1-25. Jan., 1917.

"The coefficients that we have obtained for photosynthesis are much smaller than those for most biological phenomena."

— and HEISE, GEORGE W.

(283)

THE RELATION BETWEEN LIGHT INTENSITY AND CARBON DIOXIDE ASSIMILATION. Philippine Jour. Sci., C. Botany 12 (2): 85-97. Mar., 1917.

"The published work on photosynthesis does not warrant the generally accepted conclusion that carbon dioxide assimilation in plants is proportional to the light intensity. Instead they indicate a progressively smaller augmentation of the rate of assimilation for each increase in light intensity. This decrease in the rate of augmentation continues until a point is reached at which further increase in light produces no measurable increase in assimilation."

BRUCE, EUGENE.

(284)

FROST CHECKS AND WIND SHAKES. Forestry and Irrig. 8: 159-164. Apr., 1902.

BRUCK, WERNER FRIEDRICH.

(285)

ZUR FRAGE DER WINDBESCHÄDIGUNGEN AN BLÄTTERN. Bot. Centbl. Beihefte, Bd. 20, Abt. 2, Hft. 1, p. 67-75. 1906.

Wind damage to leaves.

BRUNER, WILLIAM EDWARD, and WEAVER, J. E.

(286)

SIZE AND STRUCTURE OF LEAVES OF CEREALS IN RELATION TO CLIMATE; A STUDY IN CROP ECOLOGY. Nebr. Univ. Studies 23 (3-4): 1-37. July-Oct., 1923.

A study of the effect of weather conditions on barley, wheat, and oats.

BRUYN, L. G. DE.

(287)

THE OVERWINTERING OF PHYTOPHTHORA INFESTANS. Phytopathology 16: 121-140. Feb., 1926.

It is found that the potato blight fungus can withstand drought as well as cold. "Its growth is rather slow, and abundant only in the presence of moisture."

BRYAN, MARY K.

(288)

BACTERIAL LEAF SPOT OF SQUASH. Jour. Agr. Research 40: 385-391. Feb. 15, 1930.

"This paper describes a bacterial leaf spot which attacks summer and winter squashes and pumpkins . . . It spreads rapidly in rainy weather."

BRYANT, WALTER W.

(289)

THE WEATHER AND CYCLICAL FLUCTUATIONS. Econ. Jour. 31 (121): 46-49. 1921.

The author takes issue with Sir William Beveridge's findings in his articles on British exports and the barometer. He concludes that "considering how many causes, which are so apparently arbitrary as to be commonly called 'accidental,' affect the weather and the crops, it does

BRYANT, WALTER W.—Continued.

not seem likely that the time has yet come for long-range forecasting to become a practical factor in the regulation of the world's food supply."

BUCHENAU, FRANZ. (290)

DER WIND UND DIE FLORA DER OSTFRIESISCHEN INSELN. Abhandl. Naturw. Ver. Bremen 17: 552-577. 1903.

The effect of wind on the vegetation of the islands of East Friesland.

BUCHHEIM, A. N., and ORLOVA-BORRISOVA, E. I. (291)

INFLUENCE OF WEATHER CONDITIONS ON PERITHECIAL DEVELOPMENT IN POWDERY MILDEWS. Bol. Rast. Vestnik Otdela Fitopat. Glavnogo Bot. Sada. Morbi plantarum 17 (1-2): 26-31. 1929.

In Russian. Not examined. Abstract in Rev. Appl. Mycol. 8: 734-735. 1929.

"Brief details are given of experiments which were carried out in Podolsk (West Russia) during the summer of 1925 . . . for the purpose of determining the influence of meteorological factors on the formation of the perithecia of the powdery mildews of *Alchemilla vulgaris* and *Caragana arborescens* (*Sphaerotheca humuli* and *Erysiphe polygoni*, respectively).

"The results indicated a close relationship between temperature and the production of these organs in both species, a fairly constant sum total of 310° to 320° C. of daily mean temperatures from the moment of the first appearance of conidia being necessary to ensure their production."

BUCHINGER, A. (292)

DER EINFLUSS HOHER ANFANGSTEMPERATUREN AUF DIE KEIMUNG, DARGESTELLT AN TRIFOLIUM PRATENSE. Jahrb. Wiss. Bot. 71: 149-153. June, 1929.

The effect of initial high temperature on the germination of clover seed is discussed.

BUCHTA, VIKTOR. (293)

MRAZY V PRODUKCI OVOCINARSKÉJ A OCHRANA PROTÍ NIM. Ochrana Rostlin 6 (5-6): 122-138. Oct.-Dec., 1926.

Freezing and frost injury of fruits.

(294)

ŠKODLIVÉ NÁSLEDKY ZIMNÝCH MRAZOV V DENDROLOGII. Ochrana Rostlin 8 (4): 80-87. Aug., 1928.

On weather injury of trees.

BUHLERT. (295)

UNTERSUCHUNGEN ÜBER DAS AUSWINTERN DES GETREIDES. Landw. Jahrb. 35: 837-887. 1906.

The author experiments with different kinds of grain with regard to their resistance to frost.

BURGE, W. E., and BURGE, E. L. (296)

EFFECT OF TEMPERATURE AND LIGHT ON CATALASE CONTENT OF SPIROGYRA. Bot. Gaz. 77: 220-224. Apr., 1924.

"A fall in temperature produces a decrease in the catalase of *spirogyra* and a rise in temperature an increase . . . Light also produces an increase in the catalase of *spirogyra*, less extensive, however, than that brought about by a rise in temperature."

— and BURGE, E. L. (297)

A STUDY OF THE EFFECT OF HOT AND COLD WEATHER ON THE CATALASE OF THE PLANT AND ANIMAL IN RELATION TO THEIR RESPIRATORY METABOLISM. Amer. Jour. Bot. 15: 412-415. July, 1928.

"The catalase of the needles of pine trees is decreased in the winter and increased in the summer corresponding with the decrease in metabolism in cold weather and the increase in warm weather."

BURGERSTEIN, ALFRED. (298)

KEIMVERSUCHE MIT GETREIDEFRÜCHTEN IM LICHT UND BEI LICHTABSCHLUSS. Ztschr. Landw. Versuchsw. Österr. 16: 849-860. Aug., 1913.

The author finds that light or the absence of light makes little difference in the germination of rye, wheat, barley, or oats.

(299)

PFLANZENKULTUREN IM DIFFUSEN TAGESLICHT. Verhandl. K. K. Zool.-Bot. Gesell. Wien 58: 322-329. 1908.

Abstract in Expt. Sta. Rec. 20: 1124. June, 1909.

"Experiments are reported on the growth of about 20 species of ornamental plants in diffused light and in beds so situated as to receive direct sunlight for a few hours in the morning and evening and diffused light

BURGERSTEIN, ALFRED—Continued.

during midday. Almost without exception the growth of the stalks, leaves, flowers, and seed capsules was greatest in what is termed the mixed light . . . Similar conditions were noted for flower and seed production."

BURGESS, JAMES L. (300)

RELATION OF VARYING DEGREES OF HEAT TO THE VIABILITY OF SEEDS. Jour. Amer. Soc. Agron. 11: 118-120. Mar., 1919.

BURNS, GEORGE P. (301)

LIGHT ON THE UNDERBRUSH. Vt. Bot. and Bird Clubs Joint Bul. 12: 30-32. Nov., 1927.

(302)

STUDIES IN TOLERANCE OF NEW ENGLAND TREES. I-IX. Burlington, 1914-1929. (Vt. Agr. Expt. Sta. Bul. 178, 181, 193, 235, 257, 261, 267, 282, 298.)

(303)

TIP-BURN IN WHITE PINE. Phytopathology 6: 116. Feb., 1916.

(304)

WEATHER CONDITIONS AND PLANT DEVELOPMENT. Brooklyn Bot. Gard. Mem. 1: 119-122. 1918.

The author discounts the value of averages for humidity, sunshine, wind, temperature, etc., extending over long periods. "In all study of the relation of weather conditions to the development of plants the importance of critical periods in the environment must be taken into consideration."

BURNS, WILLIAM. (305)

DROUGHT RESISTANCE. Poona Agr. Col. Mag. 13 (2): 56-59. Oct., 1921.

— and KULKARNI, L. B. (306)

A LINE SURVEY OF GRASSLAND WITH REFERENCE MAINLY TO RAINFALL. Jour. Indian Bot. Soc. 6: 103-108. Dec., 1927.

BURROWS, ALVIN T. (307)

HOT WAVES; CONDITIONS WHICH PRODUCE THEM, AND THEIR EFFECT ON AGRICULTURE. U. S. Dept. Agr. Yearbook 1900: 325-336. 1901.

Some of the effects on crops of periods covering three or more consecutive days of high temperature are briefly indicated.

BURTT-DAVY, JOSEPH. (308)

CLIMATIC REQUIREMENTS OF THE MAIZE CROP. Transvaal Agr. Jour. 7: 431-437. Apr., 1909.

"Temperature appears to have no direct effect upon the yield of maize per acre, but it does influence the maturing of the grain, and often in this way affects the yield of marketable grain, especially at our higher altitudes . . . Rainfall, on the contrary, has a very direct bearing upon yield."

(309)

ELMS FOR THE SEMIARID REGIONS OF THE EMPIRE. Empire Forestry Jour. [London] 8: 101-104. 1929.

Two Chinese species of elm are recommended for planting in semiarid regions because of their qualities of hardiness and drought resistance.

BUSHNELL, JOHN. (310)

DO POTATO VARIETIES DEGENERATE IN WARM CLIMATES? EXAMPLES OF VIGOROUS POTATO CLONES IN OHIO. Jour. Heredity 19: 132-134. Mar., 1928.

Three instances are given to show that "degeneration of potatoes is entirely due to diseases rather than to any direct effect of high temperature itself upon the hereditary complex."

(311)

THE EFFECT OF TEMPERATURE ON THE POTATO PLANT. Amer. Soc. Hort. Sci. Proc. 1923: 307-310.

"In this study of potato plants under approximately controlled greenhouse conditions, humidity had no effect on the growth of the plants, but temperature had a striking effect. The maximum temperature at which early Ohio potatoes produced tubers was between 20° and 23° C. At 23° C. and above, the failure to produce tubers is attributed to an increase in the rate of respiration, thus consuming the carbohydrates that at lower temperatures are stored in the tubers."

(312)

THE RELATION OF TEMPERATURE TO GROWTH AND RESPIRATION IN THE POTATO PLANT. 29 p. University Farm, St. Paul, 1925. (Minn. Agr. Expt. Sta. Tech. Bul. 34.)

BUSHNELL, JOHN—Continued.

From data obtained by the author, "together with evidence from the literature, the suggestion is made that deficiency of carbohydrate arising from excessive respiration may be very generally the limiting factor in plant growth at temperatures above the optimum."

(313)

THE RELATION OF WEATHER TO THE DATE OF PLANTING POTATOES IN NORTHERN OHIO. p. 343-384. Wooster, 1926. (Ohio Agr. Expt. Sta. Bul. 399.)

The "evidence points to summer temperature as an important limiting factor in potato yields in Ohio."

BUSSE, WALTER.

(314)

DIE KEIMUNG DES TABAKSAMENS IN IHREN BEZIEHUNGEN ZUM LICHT. Ztschr. Bot. 18: 65-97. 1926.

Not seen.

The effect of light on tobacco-seed germination.

BUSSE, WARREN F.

(315)

EFFECT OF LOW TEMPERATURES ON GERMINATION OF IMPERMEABLE SEEDS. Bot. Gaz. 89: 169-179. Apr., 1930.

A study of the effect of intense freezing on sweet clover and alfalfa seeds.

BUTLER, EDWIN J.

(316)

LAS CONDICIONES METEOROLÓGICAS Y LAS ENFERMEDADES DE LAS PLANTAS. Bol. Agr. Téc. y Econ. [Spain] 17 (201): 361-378. Sept., 1925.

A general discussion of the effect of weather on plant diseases, illustrated by references to different countries.

(317)

THE EFFECT OF CLIMATE ON CEREAL DISEASES. Pan-Pacific Sci. Cong. Proc. (1923) 1 (pt. 4): p. 126-131. 1923.

The author indicates the interest and importance of the study of the relation between meteorological conditions and cereal diseases. He instances the effect of weather on crop diseases in various countries.

(318)

METEOROLOGICAL CONDITIONS AND PLANT DISEASES. Internatl. Rev. Sci. and Pract. Agr. (n. s.) 3: 369-382. Apr.-June, 1925.

The author gives short résumés of the results of studies made of the effects of temperature, humidity, and radiation on various plant diseases.

BUTTERS, FREDERIC K., and ROSENDAHL, C. OTTO.

(319)

SOME EFFECTS OF SEVERE FREEZING UPON VEGETATION IN A CONDITION OF ACTIVE GROWTH. Science (n. s.) 33: 261. Feb. 17, 1911.

and ROSENDAHL, C. OTTO.

(320)

SOME EFFECTS OF SEVERE FROST UPON VEGETATION IN A CONDITION OF ACTIVE GROWTH. Minn. Bot. Studies, pt. 2. 4: 153-159. Sept. 15, 1911.

"Prolonged solid freezing will injure many plants and parts of plants which are not hurt by 2.5° C. of frost. Mechanical damage from loss of turgidity and brittleness of frozen members is great. Hard freezing is far more destructive to our native woody plants than to our herbaceous vegetation. Woody plants recover from hard freezing very slowly and produce very abnormal growth for the season in which it occurs.

CALCATERRA, E.

(321)

GLI EFFETTI DELLE GELATE E COME RIMEDIARVI. Met. Prat. [Osserv. Montecassino, Italy] 6 (1): 34-44. Jan.-Feb., 1925.

The effects of frost on plants and methods of obviating them.

CALDWELL, JOSEPH S.

(322)

CHEMICAL COMPOSITION OF APPLE JUICES AS AFFECTED BY CLIMATIC CONDITIONS. Jour. Agr. Research 36: 289-365. Feb. 15, 1928.

Temperature and sunshine are shown to influence the sugar content of the fruit.

(323)

MEAN SUMMER OR "OPTIMUM" TEMPERATURES IN RELATION TO CHEMICAL COMPOSITION IN THE APPLE. Jour. Agr. Research 36: 367-389. Feb. 15, 1928.

It is shown that "mean summer temperature as a separate factor has little influence in determining the composition of the crop."

(324)

THE RELATION OF ENVIRONMENTAL CONDITIONS TO THE PHENOMENON OF PERMANENT WILTING IN PLANTS. Physiol. Researches 1 (1): 1-56. July, 1913.

CALDWELL, JOSEPH S.—Continued.

"The condition of permanent wilting may result from the operation of either one or both of two factors, (a) decrease in the soil moisture content, and (b) loss of water from the plant by transpiration."

(325)

SOME EFFECTS OF SEASONAL CONDITIONS UPON THE CHEMICAL COMPOSITION OF AMERICAN GRAPE JUICES. *Jour. Agr. Research* 30:1133-1176. June 15, 1925.

The results of investigations made at Vineland, N. J., indicate that "the amount of sunshine received during the period March to September, inclusive, is subject to the greatest annual variations and is the dominant factor in determining the chemical character of the crop."

CALL, L. E., and HALLSTED, A. L.

(326)

THE RELATION OF MOISTURE TO YIELD OF WINTER WHEAT IN WESTERN KANSAS. 34 p. Manhattan, 1915. (*Kans. Agr. Expt. Sta. Bul.* 206.)

"In western Kansas moisture is the limiting factor in the production of wheat."

CALVINO, EVA MAMELI DE.

(327)

EFFECTS OF A HAIL STORM ON SUGAR CANE AND OTHER CULTIVATED PLANTS. *La Planter* 74: 450-451. June 6, 1925.

Among the other plants injured were tobacco, tomatoes, cabbages, lettuce, and bananas.

(328)

EFFETTI FISIOLÓGICI DEL FREDDO SULLE PIANTE. *Costa Azzurra Agricola-Floreale* 6 (2): 29-33. Feb., 1926.

A discussion of the physiological effect of cold on plants.

— and MASTÍO, FRANCISCO.

(329)

ACCIÓN DEL FRÍO SOBRE LA GERMINACIÓN DE LAS YEMAS DE LA CAÑA DE AZÚCAR. *Chaparra Agr.* 2 (1-2): 26-28. May-June, 1925.

A brief account of the effect of cold on the germination of sugar cane buds.

CALVINO, MARIO.

(330)

LA LUZ Y LA PRODUCCIÓN VEGETAL. *Sugar* 23: 644-646. Nov., 1921.

A discussion of the effect of light on plant production.

CALZECCHI-ONESTI, A.

(331)

LA DISTRIBUZIONE DELLE PIOGGIE IN ITALIA IN RAPPORTO ALL'AGRICOLTURA. *Italia Agr.* 58 (2): 51-56. Feb. 15, 1921.

Abstract in *Expt. Sta. Rec.* 45: 809. Abstract number. 1922.

"This article discusses briefly the importance of rainfall in agricultural production, the variability of meteorological factors in Italy, the value of rainfall stations and the need of more of them, and the total annual precipitation and its frequency and distribution as related to agriculture."

CAMPANINI, L.

(332)

UN NUOVO PARASSITA DEL FRUMENTO? *Coltivatore* 72: 146-148. Aug. 20, 1926.

Weather injuries rendering wheat susceptible to attacks of *Septoria graminis*.

CANNEY, ERNEST E.

(333)

RAIN-GROWN COTTON AND CLIMATE. *Textile Inst. Jour.* 15: T533-T542. 1924.

"The general conception of suitable climatic conditions for a rainfall crop of cotton is discussed and it is suggested that excessive rainfall and cloudiness, and insufficiency of sunshine, especially during the maturation period, are worth as much consideration as adequate water supply and warmth."

CAPUS, GUILLAUME.

(334)

LA VALEUR ÉCONOMIQUE DES PLUIES TROPICALES. *Ann. Geogr.* 23: 109-126. Mar. 15, 1914.

The author has made analyses of the nitric and ammoniacal nitrogen in the rainfall at Hanoi, Tonkin, from 1902 to 1909.

CAPUS, JOSEPH.

(335)

NOTE SUR LE DÉVELOPPEMENT DE QUELQUES MALADIES DES PLANTES PENDANT LA SÉCHERESSE. *Soc. Path. Vég. France Bul.* 5, (2): 94-96. Apr., 1919.

Three plant diseases are noted which developed during a period of drought.

- CARBONELL, LUIS G. Y. (336)
 RESUMEN GENERAL DE LAS CONDICIONES CLIMATOLÓGICAS, Y DE SU EFECTO EN LA AGRICULTURA, EN LA REPÚBLICA DE CUBA. Cuba Sec. Agr. Com. y Trab. Bol. Ofic. 10 (2): 167-174. Mar. 1, 1911.
 Contains a brief account of the effect of meteorological conditions in Cuba in 1910 on the growth of crops.
- CARLETON, MARK A. (337)
 THE SMALL GRAINS. 699 p. New York, The Macmillan Co., 1916.
 The influence of precipitation, temperature, humidity, wind, and sunlight on cereal crops is discussed on p. 254-277.
- (338)
 SUCCESSFUL WHEAT GROWING IN SEMIARID DISTRICTS. U. S. Dept. Agr. Year-book 1900: 529-542. 1901.
 This involves a discussion of the effect of weather conditions on wheat.
- CARNE, WALTER M. (339)
 CRACKING AND RUSSETING OF DUNN'S AND OTHER APPLES. Jour. Dept. Agr. West. Aust. (2) 2 (2): 214. June, 1925.
 "It would appear that the russetting and cracking of Dunn's and other apples is connected with climatic and growth conditions . . . It varies from season to season, being apparently most marked in years of early and dry summers, and least when the summers are late and the early summer is relatively moist."
- (340)
 NOTES ON DATE CULTURE IN AMERICA, WITH SOME CONSIDERATION OF ITS POSSIBILITIES IN NEW SOUTH WALES. Agr. Gaz. N. S. Wales 25: 805-808. Sept. 2, 1914.
 "The date palm requires great heat, low humidity, and no rain during the six months of the fruiting season. Rain is the greatest danger . . . Yet there must be a plentiful supply of water always available at the roots or the fruit will dry up."
- (341)
 A PRELIMINARY CENSUS OF THE PLANT DISEASES OF SOUTHWESTERN AUSTRALIA. Jour. Roy. Soc. West. Aust. 11: 43-68. 1924-25.
 "Plants in Western Australia are liable to parasitic diseases in the wet season and to nonparasitic troubles in the dry season."
- CARPENTER, C. C. (342)
 FACTORS IN HARDENING PLANTS. Market Growers' Jour. 30: 314. May 15, 1922.
 Some of the effects of freezing on plant tissue are indicated.
- CARPENTER, FORD A. (343)
 SUNSPOTS, CYCLES, AND SEASONAL WEATHER PREDICTIONS. Calif. Cult. 73: 459, 466-467. Nov. 9, 1929.
 The author finds that a strict investigation of the relations between sunspots, cycles, and seasonal weather predictions gives only negative results except in the case of November weather which he believes can usually be looked upon as an indication of the coming seasonal rainfall.
- (344)
 UTILIZATION OF FROST WARNINGS IN THE CITRUS REGION NEAR LOS ANGELES, CAL. U. S. Mo. Weather Rev. 42: 569-571. Oct., 1914.
 Contains a brief discussion of weather conditions causing frost and their effect on lemons and oranges.
- CARRICK, D. B. (345)
 THE EFFECT OF FREEZING ON THE CATALASE ACTIVITY OF APPLE FRUITS. 18 p. Ithaca, 1929. (N. Y. Cornell Agr. Expt. Sta. Mem. 122.)
 "From the data presented it is clear that extreme freezing of the McIntosh apple, in which most, if not all, of the cells are killed, markedly reduces the catalase activity."
- (346)
 THE EFFECT OF FREEZING ON THE RESPIRATION OF THE APPLE. 28 p. Ithaca, 1928. (N. Y. Cornell Agr. Expt. Sta. Mem. 110.)
 Results are given of experiments made with Winesap, Baldwin, and McIntosh apples.
- CARSNER, EUBANKS. (347)
 ANGULAR-LEAFSPOT OF CUCUMBER: DISSEMINATION, OVERWINTERING, AND CONTROL. Jour. Agr. Research 15: 201-220. Oct. 21, 1918.

CARSENER, EUBANKS—Continued.

"The damage caused by the angular-leafspot can not be accurately estimated. It varies greatly with differing weather conditions . . . Rain is the most important means of dissemination."

(348)

SEASONAL AND REGIONAL VARIATIONS IN CURLY-TOP OF SUGAR BEETS. Science (n. s.) 63: 213-214. Feb. 19, 1926.

CARTER, WALTER.

(349)

ECOLOGICAL STUDIES OF CURLY-TOP OF SUGAR BEETS. (Abstract) Phytopathology 17: 747. Oct., 1927.

Abstract of a paper presented at the eleventh annual meeting of the Pacific division of the American Phytopathological Society, Reno, Nev., June 23, 1927.

"High light intensity, temperature, and evaporation appear to favor the development of severe curly-top symptoms."

CASKIE, JAQUELIN AMBLER.

(350)

LIFE AND LETTERS OF MATTHEW FONTAINE MAURY. 191 p. Richmond, Va., Richmond Press (Inc.), 1928.

From an address delivered by Matthew Fontaine Maury in 1871: "The crops may be regarded in one sense as meteorological expression of the weather from seed time to harvest; for that there is a physical relation between the weather and the crops is obvious to all . . . The relation between the weather and the crops is as capable of scientific development as were the relations between sea voyages and the winds 25 years ago." p. 99. 102.

CATES, J. S.

(351)

LIGHT SIGNALS FOR PLANTS. Country Gent. 91 (10): 3-4, 155-157. Oct., 1926.

A popular account of plant response to light.

CATRAN, FRANCISCO.

(352)

CLIMATOLOGIA. Rev. Agr. [Dominican Repub.] 14: 217-220. Oct. 31, 1918.

The author shows that a knowledge of weather conditions makes it possible to forecast the success of certain crops in different parts of the Dominican Republic. He illustrates his point with reference to maize and wheat.

CAVARA, FRIDIANO.

(353)

ALCUNE RICERCHE INTORNO ALL'AZIONE DEL VENTO SULLO SVILUPPO DELLE PIANTE. Ist. Orto Bot. [Naples] Bul. 2, fasc. 4: 505-512. 1910.

The author shows by means of experiments that the wind's action produces profound changes in the form, structure, and growth of plant organs.

and PARISI, ROSA.

(354)

SULLA RESISTENZA DELLE PIANTE ALL'AVVIZZIMENTO. Naples Univ. Bul. Orto Bot. 5: 261-273. 1918.

A study of drought resistance of plants.

CERIGHELLI, RAOUL.

(355)

INFLUENCE DE LA LUMIÈRE ET DE LA TEMPÉRATURE SUR LA GERMINATION DES GRAINES EN ABSENCE DE CALCIUM. Compt. Rend. Acad. Sci. [Paris] 182: 483-485. Feb. 15, 1926.

The author concludes that during the germination of pea seeds in the absence of lime, light exercises no influence on the growth of the root or stalk, while temperature has a special effect upon the growth of both.

(356)

INFLUENCE DES CONDITIONS DU MILIEU SUR LA GERMINATION DES GRAINES EN ABSENCE DE CALCIUM. Compt. Rend. Acad. Sci. [Paris] 181: 728-730. Nov. 16, 1925.

The author shows that pea seeds can not germinate properly in the absence of lime.

(357)

SUR LA RESPIRATION DES PLANTES VERTES À LA LUMIÈRE. Bul. Soc. Bot. France 71 (3-4): 251-256; (5-6): 653-656. 1924.

A study of the influence of light on plant breathing at different temperatures.

CHAMNEY, N. P.

(358)

THE CLIMATOLOGY OF THE GOLD COAST. Gold Coast Dept. Agr. Bul. 15, 63 p. Aug., 1928.

Contains a chapter on meteorology and agriculture in the Gold Coast. p. 32-36.

- CHANDLER, WILLIAM H. (359)
 COMMERCIAL FERTILIZERS FOR STRAWBERRIES. p. 279-305. Columbia, 1913.
 (Missouri Agr. Expt. Sta. Bul. 113.)
 Contains a short paragraph on the relation of low temperatures to strawberry growing. "Since the strawberry plant bears its flowers so near the ground where the temperature is much lower than 10 or 12 feet from the ground, the blooms are often killed by frosts that do not injure either apples or other tree fruits."
-
- FRUIT GROWING. 777 p. New York, Houghton Mifflin Co., 1925. (360)
 Contains chapters on the rest period of fruit plants and seeds, freezing injury, and the response of fruit trees and plants to air, wind, light, and temperature.
-
- THE KILLING OF PLANT TISSUE BY LOW TEMPERATURE. p. 143-369. Columbia, 1913. (Missouri Agr. Expt. Sta. Research Bul. 8.) (361)
 The resistance to low temperature of a large number of plants is discussed. "There seems to be no constant relation between the rate of growth of plant tissue and resistance to low temperature." Among the subjects discussed are: Effect of previous exposure to temperature slightly above killing temperature; relation of low temperature to peach growing; killing of apples; killing of cherries and plums.
-
- NORTH AMERICAN ORCHARDS. THEIR CROPS AND SOME OF THEIR PROBLEMS. 516 p. Philadelphia, Lea & Febiger, 1928. (362)
 Contains two chapters on climatic features of importance in the orchard, p. 26-74. See also climatic responses under different varieties of fruit trees.
-
- SOME PECULIAR FORMS OF WINTER INJURY IN NEW YORK STATE DURING THE WINTER OF 1914-15. Amer. Soc. Hort. Sci. Proc. 1915: 118-121. (363)
-
- SOME PROBLEMS CONNECTED WITH KILLING BY LOW TEMPERATURE. Amer. Soc. Hort. Sci. Proc. 1914: 56-63. (364)
 The effects of freezing and of thawing on plant tissue are discussed.
-
- WINTER INJURY IN NEW YORK STATE DURING 1917-18. Amer. Soc. Hort. Sci. Proc. 1918: 18-24. (365)
 The effect of the low temperatures of the winter of 1917-18 on fruit trees in New York State is discussed.
-
- WINTER INJURY OF FRUIT TREES. Hoosier Hort. 1 (3): 3-8. Apr., 1919. (366)
-
- WINTER KILLING OF PEACH BUDS AS INFLUENCED BY PREVIOUS TREATMENT. 47 p. Columbia, 1907. (Missouri Agr. Expt. Sta. Bul. 74.) (367)
 "In most of Missouri fruit buds on trees that have made rather a vigorous growth, caused by reasonably severe heading back or by cultivation, are the less liable to winter injury."
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- CHAPPUZEAU, BERNHARD. (368)
 UNTERSUCHUNGEN ÜBER DIE BEDEUTUNG VON LICHT, FEUCHTIGKEIT UND KORN-GRÖSSE BEI DER KLEEKEIMUNG. Angew. Bot. 12: 99-162. Mar.-Apr., 1930.
 A study of the effect of light and moisture on clover seeds.
-
- CHAPTAL, L. (369)
 CARACTÈRES ET CONSÉQUENCES AGRICOLES DU RÉGIME DES PLUIES À MONTPELLIER. Ann. Sci. Agron. Franç. et Étrang. 41 (1): 28-38. Jan.-Feb., 1924.
-
- LA CLIMATOLOGIE AGRICOLE ET LA PRÉVISION DES RÉCOLTES. 12 p. Montpellier, Impr. Roumegous et Déhan, 1927. (370)
 A general discussion of the relation of weather conditions to crop yield.
-
- INFLUENCE DE QUELQUES CONDITIONS CLIMATÉRIQUES ACCIDENTELLES SUR LE RENDEMENT DU VIGNOBLE. Météorologie (n. s.) 3: 449-451. Oct., 1927. (371)
 The effect of spring frosts, low temperatures in May and June, and drought on the yield of vineyards is briefly discussed.

CHAPTAL, L.—Continued.

(372)

INFLUENCE DES CONDITIONS CLIMATÉRIQUES SUR LE GROSSISSEMENT DES GRAINS DE RAISIN. *Compt. Rend. Acad. Agr. France* 14: 1202-1207. Dec. 5, 1928.

It is shown that in southern France the humidity of the mornings and evenings in August is particularly favorable to the swelling of grapes.

(373)

LA MÉTÉOROLOGIE AGRICOLE ET LA PRÉVISION DES RENDEMENTS. *Assoc. Franç. Avanc. Sci. Compt. Rend.* 48: 1032-1038. 1924.

The author discusses briefly the determination of critical periods, the relations between weather and yield, coefficients of correlation, and regression equations.

(374)

LE RÔLE DE L'HUMIDITÉ ATMOSPHÉRIQUE DANS LE GROSSISSEMENT DES RAISINS.

Ann. Sci. Agron. Franç et Étrang. 47: 236-245. Mar., 1930.

Not seen.

(375)

SUR LES RELATIONS QUI EXISTENT ENTRE QUELQUES FACTEURS CLIMATÉRIQUES ET LA VÉGÉTATION DE LA VIGNE. *Compt. Rend. Acad. Agr. France* 16: 509-513. Apr. 9, 1930; also in *Vie Agr. et Rurale* 19: 357-358. June 1, 1930.

An account of the influence of temperature, insolation, rainfall, humidity, and evaporation on the production of the vine in 1929.

CHAUVIGNÉ, AUGUSTE.

(376)

L'INFLUENCE DE LA SÉCHERESSE SUR LES HYBRIDES PRODUCTEURS DIRECTS. *Rev. Vitic.* 52: 197-199. Mar. 18, 1920.

The drought of 1919 in Touraine is studied and its effect on vines, particularly on direct hybrid bearers.

CHAVERNAC, FÉLIX.

(377)

PRÉSERVATION DES GELÉES PRINTANIÈRES. NOUVEAU PROCÉDÉ. *Prog. Agr. et Vitic.* 32: 211-213. Feb. 12, 1911.

The author suggests protection from frost by means of artificial wind.

CHILCOTT, E. C.

(378)

THE RELATIONS BETWEEN CROP YIELDS AND PRECIPITATION IN THE GREAT PLAINS AREA. 94 p. Washington, Govt. print. off., 1927. (U. S. Dept. Agr. Misc. Circ. 81.)

"Notwithstanding the fact that annual precipitation is a vital factor in determining crop yield, it is seldom if ever the dominant factor; but the limitation of crop yield is most frequently due to the operation of one or of several inhibiting factors other than shortage of rainfall."

CHIRITESCU, ARVA M.

(379)

DER EINFLUSS VON TROCKENPERIODEN AUF DIE SOMMERWEIZENSORTE "ULCA" IN VERSCHIEDENEN WACHSTUMSSTADIEN. *Landw. Jahrb.* 68: 407-422. 1928.

This is a study of the effect of drought on the "Ulca" variety of wheat (*Triticum vulgare lutescens* Al.) at different stages of growth. It is found that drought periods occurring at any time in the vegetation period have a harmful effect on the development and production power of the wheat plant.

CHITTENDEN, F. J.

(380)

THE EFFECT OF THE FROSTS OF THE WINTER OF 1908-09 ON VEGETATION. *Jour. Roy. Hort. Soc.* 36 (pt. 2): 358-404. Nov. 1910.

The author discusses the effect of unusually cold weather in England on the growth of a number of introduced plants.

CHRIST, HERMANN.

(381)

DIE VEGETATION UNTER DEM EINFLUSS DES TROCKENEN SOMMERS 1911 IN NÖRDLICHEN JURA. *Ber. Schweiz. Bot. Gesell., Hft.* 20, p. 254-258. 1911.

A brief account of the effect of drought, high temperatures, insolation, and wind on vegetation in northern Jura in the summer of 1911.

CHRISTENSEN, HARALD R.

(382)

OM VEJRLIGETS INDFLYDELSE PAA AFGRØDERNES UDNYTTELSE AF TILFØRTE GØDNINGSTOFFER. *Tidsskr. Planteavl* 23: 251-288. 1916.

Abstract in *Expt. Sta. Rec.* 36: 510. 1917.

"Experiments showed that the meteorological conditions of the year influenced greatly the absorption of fertilizers by plants."

- CHRISTENSEN, J. J. (383)
THE INFLUENCE OF TEMPERATURE ON THE FREQUENCY OF MUTATION IN *HELMINTHOSPORIUM SATIVUM*. *Phytopathology* 19: 155-162. Feb., 1929.
"Temperature has a profound effect on the frequency of mutation."
- CIESLAR, ADOLF. (384)
LICHT UND SCHATTHOLZARTEN. LICHTGENUSS UND BODENFEUCHTIGKEIT. WALDBAULICHE UNTERSUCHUNGEN. 21 p. Wien, W. Frick, 1909.
The effect of light and shade on forest trees is discussed.
- CLARK, ARABEL W. (385)
SEASONAL VARIATION IN WATER CONTENT AND IN TRANSPIRATION OF LEAVES OF *FAGUS AMERICANA*, *HAMAMELIS VIRGINIANA* AND *QUERCUS ALBA*. Penn. Univ. Bot. Lab. Contrib. 4: 105-143. 1919.
It is shown "that there is no connection between water content and transpiration temperature and relative humidity."
- CLARK, J. A. (386)
THE CORRELATION BETWEEN CLIMATE AND THE YIELD OF FARM CROPS IN PRINCE EDWARD ISLAND. *Sci. Agr.* 7: 261-267. Mar., 1927.
"This investigation has shown that an average mean temperature for the month of March in Prince Edward Island has usually been followed by a normal spring and farm crop yields that were very close to the average of many years. A high March temperature and an early spring has been followed by greatly reduced yields, amounting in some cases to less than 90% of all crop averages. The low mean temperature for March on the other hand has been followed by a late spring and greatly increased yields, except in the case of corn, amounting to as much as 5% above the normal of all crop averages."
- and MARTIN, J. H. (387)
VARIETAL EXPERIMENTS WITH HARD RED WINTER WHEATS IN THE DRY AREAS OF THE WESTERN UNITED STATES. 48 p. Washington, D. C., 1925. (U. S. Dept. Agr. Bul. 1276.)
Winterkilling is studied in connection with 38 varieties of winter wheat.
- MARTIN, J. H., and PARKER, JOHN H. (388)
COMPARATIVE HARDINESS OF WINTER-WHEAT VARIETIES. 19 p. Washington, D. C., 1926. (U. S. Dept. Agr. Circ. 378.)
"Low temperatures cause nearly as heavy losses to the wheat crop as all wheat diseases combined . . . The reduction of losses due to winterkilling would result in both increased yields and more economical production."
- CLARK, V. A. (389)
LIGHT AS A FACTOR IN PLANT CULTURE. *Amer. Soc. Hort. Sci. Proc.* 1905: 24-32.
"Light of different intensities and of different compositions affects different parts of plants differently."
- and TAYLOR, O. M. (390)
AN EXPERIMENT IN SHADING STRAWBERRIES. *Amer. Soc. Hort. Sci. Proc.* 1903-4: 37-40.
"The climatic conditions to which shading as a horticultural practice is applicable are a high percentage of sunshine, a rather light rainfall and a considerable wind with a consequent high rate of evaporation."
- CLAUSSEN, PETER. (391)
ÜBER DIE WIRKUNG DER FRÜHFRÖSTE AUF DEN LAUBFALL. *Mitt. Deut. Dendrol. Gesell.* no. 29, p. 313-315. 1920.
A brief discussion of the effect of early frosts on the fall of leaves.
- CLAYTON, E. S. (392)
RAINFALL AND WHEAT YIELDS. *Agr. Gaz. N. S. Wales* 41 (pt. 8): 566. Aug. 1, 1930.
The August-September rainfall is a dominant factor in the Australian wheat yield.
- CLAYTON, EDWARD E. (393)
THE RELATION OF TEMPERATURE TO THE *FUSARIUM* WILT OF THE TOMATO. *Amer. Jour. Bot.* 10: 71-88. Feb., 1923.
"It has been observed that in periods of very high air and soil temperatures the *Fusarium* diseases cause the most serious damage . . . The writer has attempted to determine definite temperature limits for the *Fusarium* wilt disease."

CLAYTON, EDWARD E.—Continued.

(394)

A STUDY OF THE MOSIAC DISEASE OF CRUCIFERS. *Jour. Agr. Research* 40: 263-270. Feb. 1, 1930.

"It is conceded that cruciferous mosaic will continue to be a minor disease on Long Island because of the natural resistance of the most important economic crucifers, cabbage, cauliflower, and Brussels sprouts and also because these crops are grown during the cool weather of fall, whereas the disease develops best at high temperatures."

(395)

WEATHER CONDITIONS IN RELATION TO THE DEVELOPMENT OF PLANT DISEASE EPIDEMICS. *Ohio State Hort. Soc. Proc. Ann. Meeting* 54: 44-45. Jan., 1921.

CLAYTON, H. HELM.

(396)

WORLD METEOROLOGY. WEATHER VARIATIONS OVER THE EARTH'S SURFACE GENERALLY CONNECTED AND THEIR RELATION TO FOOD SUPPLY AND TO BUSINESS CONDITIONS VERY MARKED. *Typos* 6 (3): 7-13. July, 1916.

Rainfall in temperate regions determines the amount of crop production and the subsequent food supply of the world."

CLEMENTS, FREDERIC E.

(397)

CLIMATIC CYCLES AND CHANGES OF VEGETATION. *In* Reports of the Conferences on cycles. p. 64-71. Washington, D. C., Carnegie Institution, 1929.

and WEAVER, JOHN E.

(398)

EXPERIMENTAL VEGETATION; THE RELATION OF CLIMAXES TO CLIMATES. 172 p. Washington, Carnegie Institution of Washington, 1924.

The effect of weather factors on grasses is discussed.

CLINE, I. M.

(399)

FREEZES OF NOVEMBER 13 AND 29-30, 1911, IN THE SUGAR, ORANGE, AND TRUCKING REGION. *U. S. Mo. Weather Rev.* 39: 1714-1716. Nov., 1911.

Reports are given relative to the effect of the freezing weather on crops in different localities of Louisiana and Texas and of the action taken to protect them.

CLINE, JOSEPH L.

(400)

FROST PROTECTION BY IRRIGATION IN SOUTHERN TEXAS. *U. S. Mo. Weather Rev.* 42: 591-592. Oct., 1914.

CLUM, HAROLD H.

(401)

THE EFFECT OF TRANSPIRATION AND ENVIRONMENTAL FACTORS ON LEAF TEMPERATURES. *Amer. Jour. Bot.* 13: 194-216, 217-230. 1926.

It is shown that "transpiration may cool the leaves of a plant 2° or 3° C., and in some cases a little more, but this reduction in temperature seems insignificant when compared with the effect of . . . the intensity of the light . . . with this is coupled the angle at which the sun's rays strike the leaf."

CLUTE, WILLARD N.

(402)

COLD AND COLOR IN PLANTS. *Gard. Chron. Amer.* 29 (2): 36. Feb., 1925.

Contains a reference to sugar formation in plants under the influence of cold.

COCK, S. A.

(403)

RIND MARKING OF CITRUS FRUITS. FINDING THE CAUSE. *Jour. Dept. Agr. Victoria* 26: 549-556. Sept., 1928.

It is shown that wind and rain cause markings on the rind of citrus fruits.

CODDING, GEORGE M.

(404)

DEFOLIATION OF SHADE TREES DUE TO HEAT. *Tree Talk* 6 (2): 25-26. 1924. Summer number.

(405)

FROST CRACKS. *Tree Talk* 6 (1): 5-6. 1924. Spring number.

Frost cracks are caused by sudden and extreme lowering of temperature. They "are more often noticed on the horse chestnut, oak, and cherry than other trees."

COFFEY, GEORGE N.

(406)

INFLUENCE OF TEMPERATURE AND MOISTURE UPON THE RATE OF GROWTH OF TOBACCO. *U. S. Mo. Weather Rev.* 35: 346-348. Aug., 1907.

"The data would indicate that the moisture in the soil was always sufficient in quantity, and that the relative humidity of the air had very little if any influence upon the rate of growth, but that a decided rise or

COFFEY, GEORGE N.—Continued.

fall in temperature was followed by an acceleration or diminution, respectively, in the rate of growth of the plants. When, however, the change in temperature was small there were other unknown factors that had a more important influence."

COFFMAN, F. A.

(407)

THE MINIMUM TEMPERATURE OF GERMINATION OF SEEDS. Jour. Amer. Soc. Agron. 15: 257-270. July, 1923.

"Seeds of different species germinate very differently at different temperatures. Within a given species, starchy seeds appear to be unable to resist low temperatures to the same degree as the more oily seeds, without injury and reducing germination percentages. All of the small grains will germinate at the temperature of melting ice . . . Under field conditions spring barley and rye will germinate more quickly than spring wheat and oats during seasons of low temperatures. The sorghums vary in their ability to withstand cold temperatures at germination . . . The seed of alfalfa and the clovers will germinate more readily at low temperatures than any of the others."

COIT, J. ELIOT.

(408)

CITRUS FRUITS; AN ACCOUNT OF THE CITRUS FRUIT INDUSTRY WITH SPECIAL REFERENCE TO CALIFORNIA REQUIREMENTS AND PRACTICES AND SIMILAR CONDITIONS. 520 p. New York, The Macmillan Co., 1915.

Contains a few references to the effect of humidity, sunlight, and winds on citrus fruits and a chapter on frost and orchard heating.

— and HODGSON, ROBERT W.

(409)

AN INVESTIGATION OF THE ABNORMAL SHEDDING OF YOUNG FRUITS OF THE WASHINGTON NAVAL ORANGES. (Calif. Univ. Pubs. Agr. Sci. 3: 283-368. Apr. 4, 1919.)

The authors show that there is a marked correlation between sudden changes of temperature or abnormal water conditions and the abscission of citrus fruits.

COOLD AS A STIMULUS TO GROWTH. Lit. Digest 69 (3): 21. April 16, 1921.

A brief account of Coville's "discovery."

(410)

COLLINGE, WALTER E.

(411)

[THE ACTION OF FROST ON PLANT LIFE] Gard. Chron. (3) 43 (1102): 89. Feb. 8, 1908.

A summary of an address by the author.

COLLINS, GUY N.

(412)

A DROUGHT-RESISTING ADAPTATION IN SEEDLINGS OF HOPI MAIZE. Jour. Agr. Research 1: 293-302. Jan., 1914.

COLLINS, J. L.

(413)

LOW TEMPERATURE TYPE OF ALBINISM IN BARLEY. Jour. Heredity 18: 331-334. July, 1927.

"A new albino type of barley is reported which appears only when the plants are grown at temperatures below 45° F . . . Limited change in light intensity does not seem to have any marked effects."

COLLISON, R. C., and HARLAN, J. D.

(414)

ANNUAL VARIATION IN APPLE YIELDS—A POSSIBLE CAUSE. 16 p. Geneva, 1927. (N. Y. State Agr. Expt. Sta. Tech. Bul. 126.)

A study has been made of the effect of temperature and rainfall on 50 Rome Beauty apple trees over a period of 16 years. "It has been shown that temperature departures from normal have not been an important factor influencing annual yields. Rainfall departures from normal, however, have been a very important factor, determining the amount of normal crop."

COMBES, RAOUL.

(415)

DÉTERMINATION DES INTENSITÉS LUMINEUSES OPTIMA POUR LES VÉGÉTAUX AUX DIVERS STADES DU DÉVELOPPEMENT. Ann. Sci. Nat., Bot. (9) 11: 75-254. 1910.

Abstract in Expt. Sta. Rec. 23: 723-724. 1910. This is a study of the effect of light on the growth, general development, fresh and dry weight, photosynthesis, flowering, and fruiting of a number of different plants.

(416)

INFLUENCE DE L'ÉCLAIREMENT SUR LA FORMATION DES GRAINES ET SUR LEUR POUVOIR GERMINATIF. Rev. Gén. Bot. 25: 130-141. Mar. 15, 1913.

The author studies the effect of light of varied intensity on the development of seeds of several plants.

COMBES, RAOUL—Continued.

(417)

LA LUMIÈRE EXERCE-T-ELLE UNE ACTION DIRECTE SUR LA DÉCOMPOSITION DE LA CHLOROPHYLLE DES FEUILLES EN AUTOMNE? *Compt. Rend. Acad. Sci. [Paris]* 181: 129-130. July 20, 1925.

The author concludes that light does not have a direct effect upon the decomposition of the chlorophyll of leaves in autumn.

CONDIT, IRA J.

(418)

FROST INJURY TO YOUNG FIG TREES. *Calif. Cult.* 56: 547. Apr. 23, 1921.

CONFERENCE OF EMPIRE METEOROLOGISTS, 1929, AGRICULTURAL SECTION.

BRITISH AGRICULTURAL METEOROLOGICAL SCHEME. OBSERVERS' HANDBOOK. 34 p. London, Printed under authority of H. M. Stationery Office by Wyman & Sons (Ltd.), 1929.

(419)

"The aim of the Agricultural Meteorological Scheme is to ascertain the effect of weather on crop growth . . . To obtain the data necessary for ascertaining the effect of weather on crop growth, schemes of observations and methods of recording such observations have been specified."

(420)

I. REPORT. 16 p. London, Printed under the authority of H. M. Stationery office by Wyman & Sons (Ltd.), 1929.

Contains an outline of the scope and methods of agricultural meteorology, as accepted by the conference.

(421)

II. PAPERS AND DISCUSSIONS. London, Printed under the authority of H. M. Stationery office by Wyman & Sons (Ltd.), [1929].

The following papers are included:

BLACKMAN, V. H.

AGRICULTURAL METEOROLOGY IN ITS PLANT PHYSIOLOGICAL RELATIONSHIPS. p. 21-23. Reprinted in *Trop. Agr.* 74: 84-90. Feb., 1930.

The author calls attention to the importance not only of the effect of individual meteorological factors on the yield of crops, but also to the complications introduced by their "interrelationship." A brief summary is given of some recent work on the subject. "The general conclusion may be drawn that the ordinary meteorological data of temperature and humidity are adequate for plant physiological purposes, though soil temperatures and humidity as well as air temperatures are required for the fuller study of the plant's reaction to these climatic factors. With regard to light, what is required is a measure of total radiation or, what would be still better, some measure of brightness and its variation during the day. The plant is certainly affected by light quality as well as light intensity."

FOISTER, C. E.

THE RELATION OF WEATHER TO PLANT DISEASES. p. 168-219. Reprinted in *Trop. Agr.* 74: 353-378. June, 1930.

"The object of this paper is to outline briefly the relation of weather to plant diseases, and to suggest methods by which the meteorologist can be of assistance to the plant pathologist . . . The group of factors primarily concerned consists in most cases of temperature, moisture (and humidity), light, and wind, the combination varying according to the disease." A list of references is given which "is believed to contain most of the important papers that have been published on the general problems of plant disease and meteorological factors."

HORNBY, A. J. W.

WEATHER AND TOBACCO. p. 57-66.

A brief account of the influence of rainfall on tobacco in Nyasaland, with tables.

IRWIN, J. O.

CROP FORECASTING AND THE USE OF METEOROLOGICAL DATA IN ITS IMPROVEMENT. p. 220-276. Reviewed in *Jour. Roy. Statis. Soc. (n. s.)* 93 (pt. 1): 123. 1930.

A brief account of crop forecasting methods in use in Great Britain, the United States and India, and of researches in the British Empire, in the United States, and in Sweden on the relation between weather and crops is followed by an outline of the direct and indirect value of crop forecasts based on weather.

JACOB, S. M.

CROP AND WEATHER DATA IN INDIA AND THEIR STATISTICAL TREATMENT. p. 277-298.

JACOB, S. M.—Continued.

Reprinted from Agr. Jour. India 22 (pt. 4): 269-280. July, 1927.

A distinction is drawn between agronomic meteorology and agricultural meteorology. "The former is concerned with the weather conditions which induce the cultivator to plough and sow land or to refrain from ploughing and sowing it or affect his capacity to do these things; the latter science has to deal with the problem of the reactions of the plant, once the seed is sown, to the weather conditions, whether these are represented by the integrated effects of rain and sunshine and so forth prior to seeding, or to the meteorological factors current during growth." Some recent literature on the subject is indicated.

KIDSON, E.

WEATHER AND WHEAT-YIELDS AT LINCOLN COLLEGE, NEW ZEALAND. p. 299-306.

Printed also in New Zealand Jour. Sci. and Technol. 11: 141-148. Oct., 1929. Abstract in New Zealand Jour. Agr. 39 (1): 34. July 20, 1929.

An investigation of the relationship between the various meteorological factors and the wheat-yield at the Canterbury Agricultural College, Lincoln, has resulted in the formulation of the following tentative conclusions: "1. The weather variations in winter are responsible for only very slight variations in the wheat yield. Cool and dry conditions are probably favorable. 2. In spring and summer warm and moist conditions are favorable, especially in the growing period, but considerable losses may be caused by heavy rain in February. 3. There seems to be little prospect of making a useful crop forecast any considerable time before harvest, since conditions in the period immediately preceding the cutting of the crop have the greatest influence on the yield."

MARTIN, F. J.

CLIMATE, CROPS, AND SOILS IN BRITISH TROPICAL COLONIES. p. 42-56.

"The object of this paper is to give some account of the climate, crops, and soils of British Tropical Colonies, with a view to tracing any existing relationships, and further, to see if such data are of use to the practical agriculturist in the colonies, or if they can assist the research worker in problems connected with agriculture."

SHAW, NAPIER.

AGRICULTURAL METEOROLOGY: A BRIEF HISTORICAL REVIEW. p. 3-13.

"If we organize to the best advantage our knowledge of weather—that knowledge which in the past has merely gone to increase what a distinguished American meteorologist has called the 'frozen assets' of the science—we shall obtain a general view of the progress and prospects of agriculture in every part of the Empire."

TAYLOR, H. V.

METEOROLOGICAL RESEARCH AND FRUIT PRODUCTION. SOME EFFECTS OF THE WEATHER ON FRUIT PRODUCTION WITH SPECIAL REFERENCE TO THE APPLE CROP. p. 95-114. Issued also in pamphlet form by H. M. Stationery office. Reprinted in Trop. Agr. 74: 164-179. 1930.

The influence of rainfall, light, and frost on apple cultivation is discussed. "The high cost of orchard heating and the uncertainty surrounding frost occurrences make it necessary for growers of deciduous fruits to rely more and more on what may be termed frost resistant varieties and it is to this aspect that the attention of research investigators is directed more particularly."

TINCKER, M. A. H.

THE VARIETAL RESPONSE OF THE PLANT TO THE LENGTH OF DAY. p. 34-39.

The results are given of studies of the response of wheat varieties and of soy beans to daylight periods of varying length.

TURNBULL, J.

METEOROLOGICAL RESEARCH AND FRUIT PRODUCTION. p. 115-120.

The influence of various weather factors on fruit production is briefly discussed by several speakers.

WALTER, A.

NOTE ON THE RELATION BETWEEN WEATHER AND CROPS. p. 40-41.

Attention is drawn to the fact that "one of the greatest of the difficulties which present themselves to the research worker, who investigates the relation between crops and weather, lies in the determination and elimination of the non-effective changes in the elements which form the subject of the usual meteorological observations."

- CONNOR, A. J. (422)
RELATION OF THE WEATHER TO THE YIELD OF WHEAT IN MANITOBA. Canada Census and Statis. Off. Mo. Bul. Agr. Statis. 11: 115-125. Apr., 1918.
The relation of temperature, rainfall, sunshine, and wind to wheat yield is discussed.
- CONOVER, L. L. (423)
BEHAVIOR OF ASPARAGUS PLUMOSUS TOWARD GRAVITATION AND LIGHT. Plant World 16: 61-68. Feb., 1913.
- COOK, ALBERT W. (424)
THE PROTECTION OF STRAWBERRIES FROM FROST THROUGH ARTIFICIAL HEATING. U. S. Mo. Weather Rev. 55: 354-357. Aug., 1927.
"The continuance of the strawberry as one of the major soft fruit crops is dependent upon the solution of the problem of late spring frosts." The results of the investigation described in this article show that strawberries and other low-lying ground crops can be protected from frost injury by methods of artificial heating.
- COOK, MELVILLE T. (425)
FALLING FOLIAGE. N. J. Agr. Expt. Sta. Rpt. 1919-20: 570-573.
An account of damage done to leaves of trees in New Jersey by low temperature soon after the leaf buds opened. (426)
- FALLING FOLIAGE. Phytopathology 11: 337-339. Aug., 1921.
Among the causes of falling foliage of both shade and fruit trees, low temperature, sun scald, and drought are suggested.
- COOK, O. F. (427)
RELATION OF DROUGHT TO WEEVIL RESISTANCE IN COTTON. 30 p. Washington, Govt. print. office, 1911. (U. S. Dept. Agr., Bur. Plant Indus. Bul. 220.)
"It has been ascertained that dry weather gives a distinct advantage in the production of cotton in the presence of the boll weevil."
- CORBETT, L. C., AND OTHERS. (428)
FRUIT AND VEGETABLE PRODUCTION. U. S. Dept. Agr. Yearbook 1925: 151-452. 1926.
Contains a section on the relation of climate and weather to fruit and vegetable production.
- CORBETT, W. (429)
THE BLOOMING AND FRUITING PERIOD OF THE TOMATO PLANT—PROGRESS REPORT. Nursery and Market Gard. Indus. Devlpmt. Soc. (Ltd.). Experimental and research station, Turner's Hill, Cheshunt, Herts, England. Ann. Rpt. 13: 87-94. 1927.
- CORRÉLATION ENTRE LES PHÉNOMÈNES ATMOSPHÉRIQUES ET LE RENDEMENT. Rev. Sci. 55 (14): 436. July 14-21, 1917. (430)
This is a summary, signed P. La., of the findings of Marengi on the influence of precipitation on the yield of lucerne, published in *L'Eco degli Ingegneri e Periti*, 1916.
- COSTANTIN, JULIEN. (431)
LA CURE D'ALTITUDE, SON EMPLOI ET SON EFFICACITÉ EN PATHOLOGIE VÉGÉTALE. ESSAI D'UNE THÉORIE DE CE PHÉNOMÈNE. Ann. Sci. Nat. Bot. (10) 9: 299-369. Dec., 1927.
A study of the effect of altitude on plant diseases, with special reference to sugarcane and tobacco. (432)
- IMPORTANCE ÉCONOMIQUE ET AGRICOLE DES CULTURES MONTAGNARDES TROPICALES. Compt. Rend. Acad. Sci. [Paris] 184: 1385-1388. June 13, 1927.
Altitude a cure for sugarcane disease in Java.
- COSTANZO, G., and NEGRO, C. (433)
METEOROLOGIA AGRICOLA. 200 p. Milano, Ulrico Hoepli, 1911.
Contains a chapter on plant life and meteorological factors, including rainfall, temperature, and light. p. 182-200.
- COSTER, C. (434)
LAUBERNEUERUNG UND ANDERE PERIODISCHE LEBENSPROZESSE IN DEM TROPISCHEN MONSUN-GEBIET OST-JAVA'S. Jard. Bot. Ann. [Buitenzorg, Java] 33 (pt. 2): 117-190. 1923.
The effect of drought on plant periodicity in Java is studied. (435)
- PERIODISCHE BLÜTEERSCHEINUNGEN IN DEN TROPEN. Jard. Bot. Ann. [Buitenzorg, Java] 35 (pt. 2): 125-162. 1926.
Periodicity in the Tropics is discussed.

- COSTER, C.—Continued. (436)
 DIE TÄGLICHEN SCHWANKUNGEN DES LÄNGENZUWACHSES IN DEN TROPEN. Rec.
 Trav. Bot. Néerland. 24: 257-306. 1927.
 Some of the weather conditions that influence plant growth in the
 Tropics are discussed.
- COTNER, FRANK B. (437)
 THE DEVELOPMENT OF THE ZOÖSPORES IN THE OÖMYCETES AT OPTIMUM TEMPERA-
 TURES AND THE CYTOLOGY OF THEIR ACTIVE STAGES. Amer. Jour. Bot. 17:
 511-546. June, 1930.
 Temperature and aeration influence the formation of sporangia or of
 zoöspores.
- COTTON PRODUCTION IN INDIA. U. S. Dept. Agr., Bur. Agr. Econ. Foreign Crops
 and Markets 11: 959-973. Dec. 28, 1925. (438)
 Contains a section on measuring the effect of rainfall and temperature
 on the yield of cotton in India. "The effect of temperature and rainfall
 is a joint effect; e. g., an excessive rainfall may be helpful in a warm
 period and harmful with low temperature. In other words, yield per
 acre is a function of rainfall and temperature, taken jointly."
- COULSON, T. J. (439)
 WINTER INJURY OF TREES. Jour. Agr. [Quebec] 26 (5): 63. Nov. 1, 1922.
- COUPIN, HENRI. (440)
 SUR LA PRODUCTION DE LA CHLOROPHYLLE PAR LES VÉGÉTAUX EXPOSÉS À UNE
 LUMIÈRE DISCONTINUE. Compt. Rend. Acad. Sci. [Paris] t. 170: 403-405.
 Feb. 16, 1920.
 On the production of chlorophyll in plants exposed to varying periods
 of daylight. (441)
 SUR LE TEMPS QUE LA CHLOROPHYLLE MET À SE DÉVELOPPER À SON MAXIMUM
 D'INTENSITÉ À LA LUMIÈRE. Compt. Rend. Acad. Sci. [Paris] 170: 753-
 754. Mar. 22, 1920.
 A brief study of the time taken by a number of crops to become green
 under the influence of light. (442)
 SUR LES PLANTULES QUI VERDISSENT À L'OBSCURITÉ. Compt. Rend. Acad. Sci.
 [Paris] 170: 1071-1072. May 3, 1920.
 The author shows that the germination of pines in darkness differs
 from the germination of pines in daylight.
- COVILLE, FREDERICK V. (443)
 THE INFLUENCE OF COLD IN STIMULATING THE GROWTH OF PLANTS. Jour. Agr.
 Research 20: 151-160. Oct. 15, 1920.
 "It is the object of the present address to show, first, that in our native
 trees and shrubs dormancy sets in before cold weather, and that cold
 weather is not necessary for the establishment of complete dormancy;
 second, that after such dormancy has begun, the exposure of the plants
 to an ordinary growing temperature does not suffice to start them into
 growth; third, that these plants will not resume normal growth in the
 warm weather of spring unless they have been subjected previously to a
 period of chilling; and, finally, a theory will be advanced to explain this
 paradoxical effect of cold in stimulating growth instead of retarding it." (444)
 THE INFLUENCE OF COLD IN STIMULATING THE GROWTH OF PLANTS. Natl. Acad.
 Sci. Proc. 6: 434-435. July 15, 1920.
 "The evidence now presented shows, first, that in our native trees and
 shrubs, dormancy sets in before cold weather, and that cold weather is
 not necessary for the establishment of complete dormancy; second, that
 after such dormancy has begun, the exposure of the plants to an ordinary
 growing temperature does not start them into growth; third, that these
 plants will not resume normal growth in the warm weather of spring
 unless they have been subjected previously to a period of chilling."
- COWARD, KATHERINE H. (445)
 THE INFLUENCE OF LIGHT AND HEAT ON THE FORMATION OF VITAMIN A IN PLANT
 TISSUES. Jour. Biol. Chem. 72: 781-799. Apr., 1927.
 Experiments are made with wheat, and white and yellow corn.
- COWLES, HENRY CHANDLER. (446)
 THE CAUSES OF VEGETATIVE CYCLES. Bot. Gaz. 51: 161-183. Mar., 1911.

COWLES, HENRY CHANDLER—Continued.

"Each climatic cycle has its vegetative cycle; each erosive cycle within the climatic cycle in turn has its vegetative cycle; and biotic factors institute other cycles, quite independently of climatic or topographic change."

COX, HENRY J.

(447)

FROST AND TEMPERATURE CONDITIONS IN THE CRANBERRY MARSHES OF WISCONSIN. 121 p. Washington, Govt. print. off., 1910. (U. S. Dept. Agr., Weather Bur. Bul. T.)

(448)

THERMAL BELTS AND FRUIT GROWING IN NORTH CAROLINA; APPENDIX: HUTT, W. N. THERMAL BELTS FROM THE HORTICULTURAL VIEWPOINT. 106 p. Washington, Govt. print. off., 1923. (U. S. Mo. Weather Rev. Sup. 19.)

It is shown that minimum temperature and its duration, together with sufficient moisture, are the chief factors involved in the growing of fruit in the North Carolina mountain region.

(449)

THE WEATHER BUREAU AND THE CRANBERRY INDUSTRY. U. S. Dept. Agr. Yearbook 1911: 211-222. 1912.

Contains the results of an investigation into frost and temperature conditions in cranberry marshes.

(450)

WEATHER CONDITIONS AND THERMAL BELTS IN THE NORTH CAROLINA MOUNTAIN REGION AND THEIR RELATION TO FRUIT GROWING. Ann. Assoc. Amer. Geogr. 10: 57-68. 1920.

The temperature and rainfall conditions are described, and reference is made to the damaging effect on fruit of the changeable temperature and shortness of season.

CRAGOE, E. J.

(451)

THE MONEY VALUE OF RAINFALL IN SELECTED CROP AREAS OF THE UNITED STATES. Jour. Geogr. 14 (1): 1-6. Sept., 1915.

The relation between rainfall and wheat and corn yield in various States is studied. "It is possible, upon the basis of results obtained, to make some fairly accurate predictions with regard to future wheat and corn yields in the various regions studied."

CRANDALL, CHARLES S.

(452)

BLOOMING PERIODS OF APPLES. Ill. Agr. Expt. Sta. Bul. 251, p. 113-145. May, 1924.

The effect of weather conditions, particularly temperature, on the blooming periods of apple trees is discussed.

(453)

BLOOMING RECORDS OF THE APPLE. Ill. State Acad. Sci. Trans. 16: 155-162. 1923.

"Temperature and general atmospheric conditions, commonly regarded as the chief determiners of lengths of blooming periods, do not act equally on all varieties in all seasons or . . . varieties develop within themselves qualities that render them less susceptible to stimulation, or more resistant to adverse conditions in one season than in another."

CRANDALL, F. K., and HARTWELL, BURT L.

(454)

A COMPARISON OF FOUR LEGUMES AS REGARDS THEIR ABILITY TO WITHSTAND WINTER CONDITIONS AND INCREASE THE YIELDS OF THE TRUCK CROPS FOLLOWING. Jour. Amer. Soc. Agron. 17: 363-367. June, 1925.

The authors study the winter hardness of red clover, alfalfa, biennial sweet clover, and winter vetch.

CRANFIELD, HAROLD T.

(455)

EFFECT OF ABNORMAL WEATHER CONDITIONS ON THE QUALITY OF MILK. Jour. Min. Agr. [Gt. Brit.] 37: 347-350. July, 1930.

The effect of drought followed by abnormal rainfall on meadows and pastures in England during the period from autumn of 1928 to spring of 1930 is indicated.

CREBERT, HEINRICH.

(456)

DIE BEZIEHUNGEN ZWISCHEN WITTERUNG, WACHSTUM UND ERTRAG BEI DER PFERDEBOHNE. Landw. Jahrb. 68: 537-558. 1929.

The author studies the effect of temperature, rainfall, and sunshine on the growth and yield of the field bean.

- CRÉPIN, CH. (457)
 LES BLÉS ET LE FROID. *Vie Agr. et Rurale* 33: 169. Mar. 17, 1929.
 This brief article calls the farmer's attention to the effect of low temperatures on wheat at different stages of its development and suggests measures to protect the grain.
- and others. (458)
 ÉTUDE SUR LA RÉSISTANCE AU FROID DU BLÉ ET DE L'AVOINE. *Ann. Sci. Agron.*
 Franç et Étrang. 46: 661-718. Nov.-Dec., 1929.
 A study of cold resistance of wheat and oats.
- CRESCINI, FRANCESCO. (459)
 SULLA GERMINAZIONE DEL GRANO A BASSA TEMPERATURA. *Nuovi Ann. [Italy]*
 Min. Agr. 8 (1-2): 41-48. June 30, 1928.
 An account of an investigation which was made to test the effect of low temperatures on grain germination.
- CRITICAL PERIOD OF GROWTH. U. S. Dept. Agr., Weather Bur. Natl. Weather and Crop Bul. 22 (ser. 1916): 2-3. (460)
 "The rainfall during the first 10 days in August is a very important factor in determining the probable yield of corn."
- CROCKER, WILLIAM. (461)
 LIGHT AND GROWTH. *Bot. Gaz.* 70: 243-246. Sept., 1920.
 A discussion of literature on the subject.
- CROMER, C. O., COBB, J. S., and JOSEPHSON, H. B. (462)
 EFFECT OF WEATHER CONDITIONS ON THE MOISTURE CONTENT OF STANDING GRAIN. *Agr. Engin.* 10 (2): 54. Feb., 1929.
 Studies of the daily and hourly variation in the moisture content of wheat and oats made at Pennsylvania State College, showed that "the daily loss in moisture content varied inversely with average daily relative humidity."
- CROSS, WILLIAM E. (463)
 LA CAÑA DAÑADA POR LAS HELADAS. *Sugar* 23 (1): 50-52; (2): 109-111. 1921.
 An account of damage to sugarcane by frost.
- and DELASCIO, SALVADOR. (464)
 AN INTERESTING EXAMPLE OF THE RESISTANCE OF JAVA SEEDLING CANES TO FROST DAMAGE. *Internatl. Sugar Jour.* 23: 678-679. Dec., 1921.
- CROW, J. W. (465)
 CLIMATE IN RELATION TO FRUIT GROWING. *N. Y. State Fruit Growers' Assoc. Proc. Ann. Meeting* 15: 80-89. 1916.
 The environmental conditions which affect fruit growing are listed as heat relations, moisture relations, and light relations.
 "The broad factors of climate which influence these conditions are latitude, altitude, relation of land areas to water areas, and air currents."
- CROWTHER, E. M. (466)
 SOME ASPECTS OF THE GEZIRA SOIL PROBLEM (AND ANALYSIS OF THE INFLUENCE OF RAINFALL ON THE YIELD OF COTTON AT THE GEZIRA RESEARCH FARM). Wellcome Trop. Research Lab. Khartoum, Chemical Section. Report of a meeting in the Sudan Gezira in December, 1925, for the discussion of certain problems connected with cotton growing. p. 18-28. 1926.
 The analysis shows that "the yields in the five rotation experiments at the Gezira Research Farm are connected with the distribution of rainfall during the previous summer, that the average effect of the rain at any period varies with the rotation, and that the connection between rainfall and yield though somewhat complicated throws some light on the action of the fallow and the nitrogen supply on the growth of the cotton plant."
- CULPEPPER, C. W., and MAGOON, C. A. (467)
 A STUDY OF THE FACTORS DETERMINING QUALITY IN SWEET CORN. *Jour. Agr. Research* 34: 413-433. Mar. 1, 1927.
 Contains a brief account of the relation of temperature, rainfall, and sunshine on different varieties of corn.
- CUNNINGHAM, J. C. (468)
 REGIONAL DISTRIBUTION OF FRUITS AND FACTORS CONTROLLING IT. *Amer. Soc. Hort. Sci. Proc.* 1913: 160-165.
 Among the most important factors which affect the distribution of crops are summer and winter temperature, spring frost, and rainfall.

CURTIS, R. H.

(469)

ON THE AMOUNT OF HEAT REQUIRED FOR THE GROWTH AND RIPENING OF WHEAT. Symons's Met. Mag. 40: 114-116. Aug., 1905.

A brief account of various attempts to determine the amount of heat necessary for the growth and ripening of cereal crops, and in particular of wheat.

(470)

THE RELATION OF METEOROLOGY TO HORTICULTURE. Jour. Roy. Hort. Soc. 32: 104-112. 1907.

The relation of temperature and of solar radiation to plant growth is discussed.

(471)

THE RELATION OF METEOROLOGY TO HORTICULTURE. Jour. Roy. Hort. Soc. 33 (pt. 1): 12-19. Jan., 1908.

The relation of rainfall to plant growth is discussed.

CUVILLIER, J.

(472)

NOTE SUR LA RÉSISTANCE DES BLÉS À L'HIVER. Jour. Agr. Prat. 49: 329-330. Apr. 28, 1928.

Not seen.

Cold resistance of wheat.

DACHNOWSKI, ALFRED.

(473)

PHYSIOLOGICALLY ARID HABITATS AND DROUGHT RESISTANCE IN PLANTS. Bot. Gaz. 49: 325-339. May, 1910.

Drought resistance of bog plants is studied.

(473a)

TRANSPIRATION IN RELATION TO GROWTH AND TO THE SUCCESSIONAL AND GEOGRAPHIC DISTRIBUTION OF PLANTS. Ohio Nat. 14: 241-251. 1914.

"It will be seen . . . that the rate of growth, the amount of it and the final size attained by a plant depend in part on favorable conditions of temperature, light intensity, food supply, and on the amount of water present in the plant. The rate or the total amount of water transpired gives no indication as to the quantity which normally is required for metabolic processes and for growth . . . But there can be no doubt that transpiration is indicative of the water relation of diverse habitats and diverse plants." There are also incidental advantages associated with transpiration.

(474)

THE VEGETATION OF CRANBERRY ISLAND (OHIO) AND ITS RELATIONS TO THE SUBSTRATUM, TEMPERATURE, AND EVAPORATION. Bot. Gaz. 52: 126-150. Aug., 1911.

The effect of temperature and rainfall on bog plants is discussed.

DAOY, GEORGE H.

(475)

COLD WEATHER GOVERNS THE GROWTH OF MANY PLANTS. AN ANNUAL PERIOD OF CHILLING IS ESSENTIAL TO THEIR HEALTH. Nature Mag. 1 (3): 36-37. Mar., 1923.

A popular account.

DÄNIKER, ALBERT.

(476)

BIOLOGISCHE STUDIEN ÜBER BAUM-UND WALDGRENZE, INSBESONDERE ÜBER DIE KLIMATISCHEN URSACHEN UND DEREN ZUSAMMENHÄNGE. Vrtljschr. Naturf. Gesell. Zürich 68 (1-2): 1-102. June 30, 1923.

The influence of temperature, atmospheric humidity, wind, light, and snow on tree and forest limits is considered.

DAIKUHARA, G.

(477)

ON THE FORMATION OF FLOWERS AFTER FROST. Imp. Cent. Agr. Expt. Sta. [Japan], Bul. 1 (2): 1-6. Oct., 1907.

The author attributes to concentration of sugar in the plant juice the result observed by him of injury to mulberry trees by a late frost. He reports that "at the base of each dead or half injured leaf bud, young green panicles had started covered with small flower buds."

DAINGERFIELD, L. H.

(478)

WEATHER AND COTTON YIELD IN TEXAS, 1899-1929, INCLUSIVE. U. S. Mo. Weather Rev. 57: 451-453. Nov., 1929.

"Other things being equal, the ideal year for cotton would be one in which there was good soil-moisture storage during the preceding winter, which should be sufficiently cold to destroy the hibernating pests;

DAINGERFIELD, L. H.—Continued.

followed by an early spring of moderate rainfall, promoting planting and cultivation of crop; a moderately dry, hot summer, with abundant sunshine, but not really droughty and not subject to sharp reversals in rainfall or temperature, thus favoring care and growth of crop and holding down weevil (this condition would favor certain other insects, however, of less serious nature). Finally, a fairly dry, bright autumn and late frost, to remove all of the cotton from the fields without deterioration or loss."

(479)
DAMAGE BY FROST AT MIDDLEBRANCH, OHIO. U. S. Mo. Weather Rev. 36: 173-174. June, 1908.

Some peculiar features of damage done by frost on the night of June 15, 1908, are described.

DANDENO, JAMES B. (480)

PHOTOTROPISM UNDER LIGHT-RAYS OF DIFFERENT WAVE-LENGTHS. Science (n. s.) 18: 604-606. Nov. 6, 1903.

"The plants which proved most susceptible to phototropic influences were barley, wheat, and tobacco seedlings."

(481)
THE PROCESS OF FREEZING IN PLANTS. Science (n. s.) 13: 916-917. June 7, 1901.

"A working explanation of the process."

DANIEL, LUCIEN. (482)

RECHERCHES SUR LE DÉVELOPPEMENT COMPARÉ DE LA LAITUE AU SOLEIL ET À L'OMBRE. Compt. Rend. Acad. Sci. [Paris.] 168: 694-697. Mar. 31, 1919.

A study of the development of lettuce in the shade and exposed to sunlight.

(483)
VARIATIONS DE LA RÉSISTANCE AU FROID CHEZ DES PLANTES GREFFÉES. Rennes Univ. Trav. Sci. 16: 20-22. 1922.

Variation in cold resistance in grafted plants.

DARKNESS AND LIGHT AFFECT FLOWERING AND FRUITING OF PLANTS. Farming 19: 218-219. Jan., 1921. (484)

DARNELL-SMITH, G. P. (485)

BLACK SPOT OF THE TOMATO. Agr. Gaz. N. S. Wales 25: 1013-1022. Dec. 2, 1914.

"It is very largely a drought disease. Where tomato plants are adequately shaded and adequately watered, the trouble is very much reduced."

and MACKINNON, E. (486)

FUNGUS AND OTHER DISEASES OF APPLE TREES. Agr. Gaz. N. S. Wales 25: 1037-1044. Dec. 2, 1914; 26: 51-57, 105-113. Feb. 2, 1915.

The effect of sun and frost on canker is pointed out.

DARROW, GEORGE M. (487)

EFFECT OF LIGHT, TEMPERATURE, AND TRANSPIRATION ON ELONGATION OF CANES OF RASPBERRY AND OTHER BRAMBLES. Amer. Soc. Hort. Sci. Proc. 26: 308-311. 1930.

(488)

EXPERIMENTAL STUDIES ON THE GROWTH AND DEVELOPMENT OF STRAWBERRY PLANTS. Jour. Agr. Research 41: 307-325. Aug. 15, 1930.

"This paper reports some of the results of a series of field studies on the relations between the growth of strawberry plants and the climatic conditions throughout the growing season . . .

"For the seasons 1925 and 1926 the limiting factor in the growth of the plants was generally temperature. In one instance, however, low growth rates appear to have been due to drought." The study leads to "the approximation of daylight-temperature optimum of about 73°."

and WALDO, GEORGE F. (489)

THE PRACTICAL SIGNIFICANCE OF INCREASING THE DAILY LIGHT PERIOD OF WINTER FOR STRAWBERRY BREEDING. Science (n. s.) 69: 496-497. May 10, 1929.

"The response of about 140 sorts suggests the possibility of a classification of new originations and introductions on the basis of their rest periods, their response to temperature and to additional light as a first step in determining their regional adaptation."

DARWIN, FRANCIS.

(490)

THE EFFECT OF LIGHT ON THE TRANSPIRATION OF LEAVES. Roy. Soc. [London.] Proc., Ser. B 87: 281-299. 1914.

The author's experiments prove that transpiration is increased by light and diminished by darkness.

(491)

A PHAENOLOGICAL STUDY. New Phytol. 18: 287-298. Nov.-Dec., 1919.

The flowering dates of the commoner plants near Brookthorpe, Gloucestershire, England, are given for the years 1917, 1918, and 1919, as well as the weekly temperatures, as having probably influenced the date of flowering.

DAS, U. K.

(492)

THE INFLUENCE OF WEATHER ON THE PRODUCTION OF SUGAR IN A TYPICAL UNIRRIGATED PLANTATION OF HAWAII. Hawaii. Planters' Rec. 32 (1): 79. Jan., 1928.

The effect of temperature and rainfall on the yield of sugar is studied.

DASTUR, JEHANGIR FARDUNJI.

(493)

CONDITIONS INFLUENCING THE DISTRIBUTION OF POTATO BLIGHT IN INDIA. Agr. Jour. India 12 (Spec. no.): 90-96. 1917.

It is shown that the disease is killed by high temperatures and fostered by cold, moist, foggy weather.

DATA AND INFORMATION ON DAMAGE CAUSED TO CULTIVATED CROPS BY THE COLD OF THE WINTER 1928-1929. Internatl. Inst. Agr. [Rome], Internatl. Bul. Plant Protect. 3: 117-121, 132-134, 150-153, 165-170, 182-185, 1929; 4: 7-8, 18-20, 1930.

(494)

The information covers a large number of countries.

DAVIS, A. R., and HOAGLAND, D. R.

(495)

FURTHER EXPERIMENTS ON THE GROWTH OF PLANTS IN A CONTROLLED ENVIRONMENT. I. THE RELATION OF LIGHT INTENSITY AND EXPOSURE TIME TO YIELD. II. THE INTERRELATIONSHIP OF TEMPERATURE AND LIGHT. Amer. Jour. Bot. 15: 624. Sup. Dec., 1928.

Abstract of a paper presented before the physiological section of the Botanical Society of America, New York, N. Y., Dec. 27-29, 1928.

DAVIS, ROBERT L.

(496)

FROST RESISTANCE IN FLAX. 8 p. Washington, D. C., 1923. (U. S. Dept. Agr. Circ. 264.)

"Flax varieties vary in their ability to resist frost, and marked improvement may be secured by making selections for increased resistance."

(497)

SUGAR CANE FUZZ VIABILITY AND DECEMBER RAINFALL. La. Planter 82: 343-344. May 4, 1929.

A positive correlation is found to exist between high rainfall and viability of fuzz.

DAVIS, WILLIAM T.

(498)

THE COLD WINTER OF 1917-18 AND ITS EFFECT UPON VEGETATION ON STATEN ISLAND. Inst. Arts and Sci. [Staten Island.] Proc. 1 (pt. 1-3): 49-54. 1918-1921.

(499)

THE ORIENTAL SYCAMORE INJURED BY COLD. Inst. Arts and Sci. [Staten Island.] Proc. 2 (pt. 2-4): 134-136. 1922-1924.

A description of injuries caused to a number of oriental plane trees on Staten Island by very cold weather during the winter of 1917-18. The peculiar splitting of tree trunks on the southerly side, which is here described, "may occasionally be referred to as sun-scald."

DAVY DE VIRVILLE, ADRIEN.

(500)

ACTION DE LA LUMIÈRE SUR LES MOUSSES. Compt. Rend. Acad. Sci. [Paris] 180: 1959-1961. June 22, 1925.

The effect of light on mosses is discussed.

(501)

L'ACTION DU MILIEU SUR LES MOUSSES. Rev. Gén. Bot. 40: 156-166. Mar., 1928.

Abstract in Biol. Abs. 3: 435. Apr.-June, 1929.

"Sunlight is always more or less unfavorable to development of mosses . . . Mosses are also very sensitive to changes in temperature

DAVY DE VIRVILLE, ADRIEN—Continued.

which may rapidly become injurious if action is continued. Optimum temperature for development of these plants is relatively low, at least for the species of the temperate flora. In general, the higher the atmospheric humidity the more rapid the development . . . Water is a medium very favorable to development of all mosses." G. J. Peirce.

DAY, PRESTON C. (502)

DROUGHT AND ITS EFFECTS IN UNITED STATES. U. S. Dept. Agr. Yearbook, 1926: 314-316. 1927.

Some of the beneficial as well as the disastrous effects of drought on crops are noted.

(503)

THE DROUGHT OF 1910 IN THE PRINCIPAL SPRING-WHEAT GROWING STATES. U. S. Mo. Weather Rev., 39: 142-143. Jan., 1911.

The author discusses the effect of intense heat and deficient precipitation on the wheat crop of 1910 in the United States.

(504)

FROST DATA OF THE UNITED STATES; AND LENGTH OF THE CROP-GROWING SEASON, AS DETERMINED FROM THE AVERAGE OF THE LATEST AND EARLIEST DATES OF KILLING FROST. U. S. Dept. Agr., Weather Bur. Bul. 5, 5 p. 1911.

DAY, WILLIAM H. (505)

WATER FOR VARIOUS CROPS. Ontario Agr. Col. and Expt. Farm Ann. Rpt. 32: 33. 1906.

The results are given of the measurement of the amount of water used by wheat, barley, oats, and peas during a dry and a wet growing season.

(506)

FROST AS A CAUSE OF DISEASE IN TREES. Quart. Jour. Forestry 22: 179-191. July, 1928.

Not seen.

DEATS, MARIAN E. (507)

THE EFFECT ON PLANTS OF THE INCREASE AND DECREASE OF THE PERIOD OF ILLUMINATION OVER THAT OF THE NORMAL DAY PERIOD. Amer. Jour. Bot. 12: 384-392. July, 1925.

After experimenting with pepper, tomato, and nasturtium plants, the author finds that in every case the rate of growth is proportional to the length of the daily exposure to light, but that in the case of flowers, the various types of plants have different light requirements. "The general conclusion to be drawn is that probably the different lengths of day influence the form of plant-development by changing the nitrogen-carbohydrate ratio."

DECEIVING THE PLANTS. Lit. Digest 65 (7): 40. May 15, 1920. (508)

An account of experiments made by the United States Department of Agriculture to test the stimulus of certain day lengths on plants.

DE FOREST, H. (509)

RAINFALL INTERCEPTION BY PLANTS: AN EXPERIMENTAL NOTE. Ecology 4: 417-419. Oct., 1923.

It would seem that, "in the case of certain types of crop plants at least, it is doubtful whether an interception loss occurs . . . Under certain conditions of wind velocity, it seems not unlikely that interception gains instead of interception losses may be customary with certain types of vegetative growth."

DEGREES OF COLD WHICH KILL FRUIT BUDS. Better Fruit 5 (4): 40. Oct., 1910. (510)

Peaches and apples are considered.

DELF, E. MARION. (511)

STUDIES OF PROTOPLASMIC PERMEABILITY BY MEASUREMENT OF RATE OF SHRINKAGE OF TURGID TISSUES. I. THE INFLUENCE OF TEMPERATURE ON THE PERMEABILITY OF PROTOPLASM TO WATER. Ann. Bot. [London] 30: 283-310. April, 1916.

DELONG, GEORGE E. (512)

THE EFFECT OF CUTTING GARNET WHEAT AT DIFFERENT STAGES OF MATURITY AND ON CONSECUTIVE DATES AFTER THE OCCURRENCE OF FROST. Sci. Agr. 9: 566-574. May, 1929.

Frost damage to wheat is discussed.

- DELONG, W. A. (513)
PENTOSAN CONTENT IN RELATION TO WINTER HARDINESS IN THE APPLE. *Sci. Agr.* 8: 512-523. Apr., 1928.
- DELWICHE, E. J., and TOTTINGHAM, W. E. (514)
EFFECT OF CLIMATE ON NITROGEN CONTENT OF MAIZE, BARLEY, AND RED CLOVER. *Jour. Amer. Soc. Agron.* 22: 681-688. Aug., 1930.
The factors considered are temperature, length of season, precipitation, and number of clear days.
- DEMPSEY, P. W. (515)
FROST HAS PLAYED SUCH HAVOC WITH CROPS THAT SPECIAL STUDY HAS BEEN MADE OF THE WHYS AND WHEREFORES OF THIS PHENOMENON. CONDITIONS CAUSING ITS PECULIAR ACTIONS, AND PROTECTION AGAINST ITS INJURIOUS EFFECTS. *Gard. Chron. Amer.* 34: 49-50. Feb., 1930.
Not seen.
- DENAÏFFE. (516)
L'HIVER DE 1913-14. SON EFFET SUR LES CÉRÉALES DANS LES ARDENNES. *Jour. Agr. Prat. (n. s.)* 27: 620-621. May 14, 1914.
The author describes the effect of very low temperatures on different varieties of wheat during the winter of 1913-14.
- DENAÏFFE, et COLLE-DENAÏFFE. (517)
SUR L'ÉTAT ACTUEL DES CÉRÉALES EN CULTURES COMPARATIVES DANS LES ARDENNES. *Jour. Agr. Prat. (n. s.)* 43: 310-312. Apr. 18, 1925.
A brief account of the effect on cereals of a short and sudden cold snap in the spring of 1925.
- DENAÏFFE, HENRI, and COLLE, JEAN. (518)
LA RÉSISTANCE DES CÉRÉALES PENDANT L'HIVER 1928-29 DANS LES ARDENNES. *Compt. Rend. Acad. Agr. France* 15: 559-566. May 1, 1929.
Cold resistance of cereals during the winter of 1928-29 in the Ardennes is briefly discussed.
- DENEUMOSTIER, CH. (519)
CONTRIBUTION À L'ÉTUDE DES CONDITIONS DE TEMPÉRATURE ET D'HUMIDITÉ DANS LA DÉTERMINATION DU POUVOIR GERMINATIF DE QUELQUES GRAMINÉES AGRICOLES. *Min. Agr. [Belgium] Bul. Agr.* 22: 983-998. 1906.
Abstract in *Expt. Sta. Rec.* 18: 1030. July, 1907.
"Studies were made to determine the optimum temperatures and moistures for the germination of the seed of Italian and perennial rye grass, meadow fescue, tall oat grass, timothy, crested dogtail grass, and velvet grass."
- DENGLER, ALFRED. (520)
JUNIFROSTCHÄDEN AN DER KIEFER. *Ztschr. Forst u. Jagdw.* 42: 670-674. Nov., 1910.
An account of damage to *Pinus sylvestris* by June frost.
- DENNY, F. E. (521)
PERMEABILITY OF CERTAIN PLANT MEMBRANES TO WATER. *Bot. Gaz.* 63: 373-397. May, 1917.
"This paper deals with an attempt to get quantitative data on the permeability of certain plant membranes to water; to determine what laws, if any, hold for the rate of penetration of water as related (1) to temperature, (2) to direction of flow through membranes . . . (4) to species of plant under consideration."
- DEPENDENCE OF MAIZE YIELD ON RAINFALL. *Union So. Africa Dept. Agr. Jour.* 8: 268. Mar., 1924. (522)
A definite relationship is shown between yield of maize and rainfall in South Africa. Figures are given covering the period from 1914-15 to 1922-23.
- DETAILED REPORT MADE ON TEXAS FROST DAMAGE. *Valley Farmer and Citrus Grower* 2 (12): 3. 12. Feb., 1925. [Reprinted in *Citrus Indus.* 6 (3): 18-19. Mar., 1925.] (523)
- DETJEN, LOUIS R. (524)
FROST INJURY IN THE APPLE, PLUM, AND PEACH. *Peninsula Hort. Soc. [Del.] Trans.* 18 (5): 23-29. 1929.
- DETMER, W. (525)
BOTANISCHE UND LANDWIRTSCHAFTLICHE STUDIEN AUF JAVA. 124 p. Jena. Gustav Fischer, 1907.
Experiments made with maize seed show that its production is four to five times as great in the moist warm climate of Buitenzorg, Java, as in the cooler and drier summer climate of Jena, p. 19-26.

- DEXTER, S. T., and others. (526)
PRELIMINARY RESULTS IN MEASURING THE HARDINESS OF PLANTS. *Plant Physiol.* 5: 215-223. Apr., 1930.
Not seen.
- DEZELL, E. G. (526a)
HISTORY OF CITRUS FRUIT FROST DAMAGES IN CALIFORNIA. *Calif. Fruit News* 59 (1608): 1, 4-5. 1919.
- DICKSON, JAMES G. (527)
MAKING WEATHER TO ORDER FOR THE STUDY OF GRAIN DISEASES. 36 p. Madison, 1926. (*Wis. Agr. Expt. Sta. Bul.* 379.)
Some of the effects of weather conditions on crop yield and diseases are indicated.
- and HOLBERT, JAMES R. (528)
THE INFLUENCE OF TEMPERATURE UPON THE METABOLISM AND EXPRESSION OF DISEASE RESISTANCE IN SELFED LINES OF CORN. *Jour. Amer. Soc. Agron.* 18: 314-322. Apr., 1926.
- and HOLBERT, JAMES R. (529)
THE RELATION OF TEMPERATURE TO THE DEVELOPMENT OF DISEASE IN PLANTS. *Amer. Nat.* 62: 311-333. July-Aug., 1928.
Temperature is shown to influence the development of the seedling blight of wheat and corn.
- and others. (530)
THE INFLUENCE OF ENVIRONMENT DURING MATURATION UPON PREDISPOSITION TO SEEDLING BLIGHT IN WHEAT AND CORN (MAIZE) STRAINS. (Abstract) *Phytopathology* 19: 79. Jan., 1929.
Abstract of paper presented at the twentieth annual meeting of the American Phytopathological Society, New York, N. Y., Dec. 28, 1928-Jan. 1, 1929.
"The past three years' tests have shown a marked relation between the environment during the period of maturation and the subsequent growth responses of the seedling as well as the complete seasonal development and yield of the crop. High-yielding, resistant strains of spring wheat became susceptible and poor producers when the seed was grown one season under the hot, midsummer conditions of central Illinois, whereas the seed of the same strains matured at Madison, Wis., resulted in resistant plants and yields characteristic of the strains. Similar results have been obtained in late-maturing inbred lines of corn when grown at Madison under unfavorable fall conditions."
- DIEHL, H. C., and WRIGHT, R. C. (531)
FREEZING INJURY OF APPLES. *Jour. Agr. Research* 29: 99-127. 1924.
- DIELS, LUDWIG. (532)
DIE FROSTSCHÄDEN IN DEN BOTANISCHEN GÄRTEN DEUTSCHLANDS IM WINTER 1928/29. *Ber. Deut. Bot. Gesell.* 47: 603-607. Jan. 30, 1930.
Frost damage in the botanical gardens of Germany during the winter of 1928/29.
- DIETRICH, MARIE. (533)
DIE TRANSPIRATION DER SCHATTEN-UND SONNENPFLANZEN IN IHREN BEZIEHUNGEN ZUM STANDORT. *Jahrb. Wiss. Bot.* 65: 98-194. 1925.
A study of transpiration in plants grown in the sun and in the shade.
- DIFFLOTH, P. (534)
LA GELÉE. COMMENT ÉVITER SES DOMMAGES. *Vie Agr. et Rurale* 33: 145-147. Mar. 10, 1929.
Contains a brief account of methods used in the United States to protect vegetation from frost.
- DILLEWIJN, C. VAN. (535)
THE CONNECTION BETWEEN LIGHT GROWTH RESPONSE AND PHOTOTROPICAL CURVATURE OF SEEDLINGS OF *AVENA SATIVA*. *K. Akad. Wetensch. Amsterdam, Proc. Sect. Sci.* 28: 775-780. 1925.
- (536)
DIE LICHTWACHSTUMSREAKTIONEN VON *AVENA*. *Rec. Trav. Bot. Néerland.* 24: 307-581. 1927.
A study of the influence of light on the growth of oats.
- DILLSTONE, GEORGE. (537)
THE SEVERE WINTER; ITS EFFECT ON SOME OF THE NEWER PLANTS AND SHRUBS. *Garden [London]* 81: 107-108, 115. 1917.

- DILLMAN, ARTHUR C. (538)
BREEDING DROUGHT-RESISTANT FORAGE PLANTS FOR THE GREAT PLAINS AREA.
40 p. Washington, D. C., 1910. (U. S. Dept. Agr., Bur. Plant Indus. Bul. 196.)
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- (539)
BREEDING MILLET AND SORGO FOR DROUGHT ADAPTATION. 19 p. Washington, D. C., 1916. (U. S. Dept. Agr. Bul. 291.)
"The drought adaptation of millet is due largely to its early maturity and low water requirement, while sorgo has in addition to these two valuable characteristics a remarkable ability to endure drought."
- DINGERKUS, R. (540)
DER WIND ALS KRANKHEITSAKTOR UND GEFAHRENQUELLE IM WALDE. Illus. Landw. Ztg. 46 (4): 46-48. Jan. 22, 1926.
A short account of the effect of wind on forest trees.
- DIX, WALTER. (541)
DIE DREI LETZTEN ERNTEN ZU KLOSTER HADMERSLEBEN IN IHREER BEZIEHUNG ZUR WITTERUNG UND DIE MÖGLICHKEIT EINER WEITEREN ERTRAGSSTEIGERUNG. Mitt. Deut. Landw.-Gesell. 29: 421-424, 431-435. 1914.
Abstract in Expt. Sta. Rec. 34: 415. Apr., 1916.
"Data are given for yields of various crops and for temperature, rainy days, precipitation, and sunshine at Hadmersleben, Germany, during 1911, 1912, and 1913, and an attempt is made to correlate the weather conditions with the crop yields, especially as related to critical periods of crop growth. A close relation was found to exist between the yield and the weather, the yield depending largely upon the adaptation or adjustment of the crop to the weather conditions."
- DIXON, HENRY H. (542)
CHANGES PRODUCED IN THE SAP BY THE HEATING OF BRANCHES. Roy. Dublin Soc. Sci. Proc. (n. s.) 14: 224-228. Mar., 1914.
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- (543)
NOTE ON THE SPREAD OF MORBID CHANGES THROUGH PLANTS BY BRANCHES KILLED BY HEAT. Roy. Dublin Soc. Sci. Proc. (n. s.) 14: 207-210. Feb., 1914.
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- (544)
RESISTANCE OF SEEDS TO HIGH TEMPERATURES. Brit. Assoc. Adv. Sci. Rpt. 1902: 805.
"The seeds of any one species show considerable individual differences in their power of resisting high temperatures . . . The time needed for germination is increased by exposure to temperatures near the maximum . . . Long exposure to a comparatively low temperature may prove more fatal than a short exposure to a high temperature."
- DODE, LOUIS A. (545)
CONSIDÉRATIONS GÉNÉRALES SUR L'ACCLIMATATION DES ARBRES ET ARBUSTES ET LES HIVERS RIGOUREUX. ESSAIS ET RÉSULTATS D'ACCLIMATATION DE VÉGÉTAUX LIGNEUX DANS LE CENTRE DE LA FRANCE. Bul. Soc. Dendrol. France 37: 55-78. Nov. 15, 1920.
Cold resistance in trees and shrubs in connection with their acclimatization.
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- (546)
ENQUÊTE SUR LES EFFETS DES FROIDS DE L'HIVER 1928-1929. Bul. Soc. Dendrol. France 73: 10-23. Feb. 15, 1930.
A description of the effect on trees in various districts of France of the cold of 1928/29.
- DODGE, A. W., Jr. (547)
STORM DAMAGED TREES. Tree Talk 5 (4): 7-10. Winter number, 1924.
Some results of wind and ice storms on trees are cited.
- DOES LIGHT AFFECT THE FERTILIZER REQUIREMENTS OF PLANTS? p. 52-54. Madison, 1924. (Wis. Agr. Expt. Sta. Bul. 362.) (548)
A few conclusions are given with regard to the relation of light to the growth and chemical composition of horticultural plants.
- DOI, TOHEI. (549)
ÜBER DIE SONNEN-UND SCHATTENBLÄTTER EINIGER BÄUME. Jour. Col. Sci. Imp. Univ. Tokyo, v. 40, art. 1, 37 p. June 20, 1917.
The differences between leaves of trees that are exposed to sunlight and those in shade are enumerated.

- DOLE, ELEAZER J.** (550)
STUDIES ON THE EFFECTS OF AIR TEMPERATURE AND RELATIVE HUMIDITY ON THE
TRANSPIRATION OF PINUS STROBUS. 39 p. Burlington, 1924. (Vt. Agr.
Expt. Sta. Bul. 238.)
- DOOLITTLE, S. P.** (551)
INFLUENCE OF TEMPERATURE ON THE DEVELOPMENT OF MOSAIC DISEASES.
(Abstract) Phytopathology 11: 46. Jan., 1921.
This is an abstract of a paper presented at the twelfth annual meeting
of the American Phytopathological Society at Chicago, Dec. 28-31, 1920.
"Preliminary experiments, while not permitting definite conclusions,
indicate that temperature may influence the development of mosaic
diseases."
- DOROGIN, G. I.** (551a)
THE INFLUENCE OF METEOROLOGICAL FACTORS ON THE DEVELOPMENT OF PLANT
DISEASES. Materiali po Mikologhii i Fitopatologhii Rossii. year 1, no. 2,
p. 3-9. 1915.
Abstract in Canada Dept. Agr. Off. Canad. Commr. Internatl. Inst.
Agr., Bul. Foreign Agr. Intel. 6: 695-697. Sept., 1916.
- DOROSHENKO, ASSIA V.** (552)
INFLUENCE OF THE LENGTH OF DAY ON TUBER SET IN POTATOES AND SEVERAL
OTHER PLANTS. Trudy Prikl. Bot. i Selekt. (Bul. Appl. Bot. and Plant
Breeding) 23 (2): 31-60. 1930.
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- (553)
PHOTOPERIODISM OF SOME CULTIVATED FORMS IN CONNECTION WITH THEIR
ORIGIN. Trudy Prikl. Bot. i Selekt. (Bul. Appl. Bot. and Plant Breed-
ing) 17 (1): 167-220, 1927; 22 (1) 219-276, 1929.
Russian with English summary.
The effect of light on wheat, barley, flax, rye, oats, millet, peas, beans,
and lentils is studied.
- DORSEY, MAXWELL J.** (554)
ADAPTATION IN RELATION TO HARDINESS. Minn. Hort. 46: 465-469. Dec., 1918.
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- (555)
A GENETIC CONCEPTION OF HARDINESS. Sci. Agr. 10: 193-199. Nov., 1929.
Some of the main features of hardiness are discussed. "The inheri-
tance studies show that hardiness is of such a nature that it can be
dealt with in the breeding plot much the same as other quantitative
characters and that we also have a genetic approach to this problem."
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HARDINESS FROM THE HORTICULTURAL POINT OF VIEW. Amer. Soc. Hort. Sci.
Proc. 1921: 173-178.
"It will be seen . . . that when hardiness is viewed from the stand-
point of horticulture there are some characteristics inherent in the
materials with which we deal that must be taken into consideration in
any well planned attempt to determine the suitable varieties for any
locality."
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HARDINESS IN TOP-WORKED VARIETIES OF THE APPLE. Amer. Soc. Hort. Sci.
Proc. 1918: 38-45.
The effect of winter injury to apple trees is studied from the results of
low temperatures in Minnesota in 1917-18.
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- (558)
RELATION OF WEATHER TO FRUITFULNESS IN THE PLUM. Jour. Agr. Research
17: 103-126. June 16, 1919.
Contains an analysis of the weather conditions that can be correlated
with the setting of fruit, the most important of which are temperature
and rainfall.
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- (559)
RUSSET RING ON THE APPLE. Minn. Hort. 46: 415-416. Nov., 1918.
Effect of frost injury.
— and BUSHNELL, J. W. (560)
THE HARDINESS PROBLEM. Amer. Soc. Hort. Sci. Proc. 1920: 210-224.
A brief review of the outstanding research in connection with winter
injury to fruit trees.
— and STRAUSBAUGH, P. D. (561)
PLUM INVESTIGATIONS. I. WINTER INJURY TO PLUM DURING DORMANCY.
Bot. Gaz. 76: 113-143. Oct., 1923.

DORSEY, MAXWELL J. and STRAUSBAUGH, P. D.—Continued.

The factors which contribute to winter hardiness in the plum are discussed.

DRAGHETTI, ALFONSO.

(562)

FORME E LIMITI DELLO XEROFITISMO NEL FRUMENTO; LE BASI BIOLOGICHE DELL'ARIDOCOLTURA. 311 p. Forlì, Tipografico Valbonesi, 1927.

Drought resistance in wheat is discussed.

THE DROUGHT OF 1921 AT KEW. Roy. Bot. Gard., Kew, Bul. Misc. Inform. no. 1, p. 1-10. 1922.

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DRUDE, OSCAR.

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LICHT-UND WÄRMESTRAHLUNG ALS ÖKOLOGISCHE STANDORTSFAKTOREN. Festschrift zum siebzigsten Geburtstage von Ernst Stahl. Flora 111/112: 227-267. 1918.

A study of the effect of light and heat on plant life.

DUCOMET, VITAL.

(565)

SÉCHERESSE ET PLANT DE POMME DE TERRE. Soc. Path. Vég. France Bul. 8 (fasc. 2): 85-87. Apr.-June, 1921.

The effect of drought on the potato crop is briefly indicated.

DUDLEY, FRANK H.

(566)

WINTER INJURY OF BALDWIN TREES. Conn. Pomol. Soc. Proc. 1919, 17-21.

DUFRENOY, JEAN.

(567)

LES CONDITIONS ÉCOLOGIQUES DU DÉVELOPPEMENT DES CHAMPIGNONS PARASITES. ÉTUDE DE GÉOGRAPHIE BOTANIQUE. Soc. Mycol. France Bul. trimest. 34 (fasc. 1-2): 8-26. June 15, 1918.

The author discusses the effect of altitude, temperature, humidity, and radiation on the development of parasitic fungi.

DUGGAR, B. M.

(568)

THE PHYSIOLOGICAL EFFECTS OF SHADING PLANTS. Amer. Soc. Hort. Sci. Proc. 1903-04: 15-26.

The effect of constant or of intermittent shading of plants is discussed.

DUMAS, LÉON.

(569)

LES CYCLONES ET L'AGRICULTURE. Ingén. Agr. Gembloux 12: 523-531. June, 1902.

Contains a general discussion of the damage done to agriculture by cyclones.

DUMONT, M. J.

(570)

LA CROISSANCE VÉGÉTALE ET LES INFLUENCES THERMIQUES. Compt. Rend. Acad. Agr. France, 13: 630-633. June 8, 1927.

A brief account of the effect of temperature on plant growth.

DUNEGAN, J. C.

(571)

WINTER INJURY TO APPLES. INFLUENCE OF RECENT PRUNING. U. S. Dept. Agr., Bur. Plant Indus. Plant Disease Repr. 14: 71-72. May 1, 1930. [Mimeographed.]

DUNGAN, GEORGE H.

(572)

EFFECT OF HAIL INJURY ON THE DEVELOPMENT OF THE CORN PLANT. Jour. Amer. Soc. Agron. 20: 51-54. Jan., 1928.

"Corn plants were treated experimentally in such a manner as to simulate the injury of hail. A light treatment inflicted at the time the tassels were just emerging reduced the yield of grain only 2.7 bushels an acre. One week later when the plants were in tassel and ear-shoots, but no silks were showing, an artificial hail treatment of the same severity reduced the yield 9.9 bushels an acre. A severe hail storm, represented in this experiment by jerking off the blades, was very destructive to corn yields, especially when it occurred at the early silk stage of the plant. Applications of this same treatment at later periods in the growth of the corn plant produced a less damaging effect, and the reduction in yield was progressively less as the treatment was administered later in the plant's development."

DUNLOP, W. R.

(573)

RAINFALL CORRELATIONS IN TRINIDAD. Nature [London] 115: 192-193. Feb. 7, 1925.

A brief statement with regard to the influence of rainfall on cacao and rubber in Trinidad. "In Trinidad the general complaint is that short cacao crops are due to drought. On many of the best and largest estates my work indicates that the trouble is the result—or partly the result—of too much rain."

- DUNLOP, W. R.—Continued. (574)
 WEATHER WISDOM IN AGRICULTURE WITH HINTS ON FORECASTING. 46 p.
 London, Vinton & Co. (Ltd.), 1911.
 A collection of articles which originally appeared in the Agricultural Gazette of Great Britain showing that a knowledge of the weather is of vital interest to farmers.
- DUNN, STUART, and BAKKE, A. L. (575)
 ADSORPTION AS A MEANS OF DETERMINING RELATIVE HARDINESS OF THE APPLE.
 Plant Physiol. 1: 165-178. Apr., 1926.
- DUPONT, C. (576)
 OBSERVATIONS SUR LA RÉSISTANCE DES BLÉS À LA GELÉE PENDANT L'HIVER 1928-1929 AUX CHAMPS D'EXPÉRIENCES DE TOMBLAINE ET DU DONON. Compt. Rend. Acad. Agr. France 15: 575-579. May 1, 1929.
 Cold resistance of wheat is studied.
- DURAND, MICHEL. (577)
 INFLUENCE DE LA LUMIÈRE SUR LA FORMATION DES TANNINS. Compt. Rend. Acad. Sci. [Paris] 181: 1171-1173. Dec. 28, 1925.
 The effect of light on the formation of tannin in plants is discussed.
- DURANDARD, MAURICE. (578)
 VARIATIONS DE L'OPTIMUM DE TEMPÉRATURE SOUS L'INFLUENCE DU MILIEU CHEZ LE MUCOR ROUXII. Compt. Rend. Acad. Sci. [Paris] 155: 723-726. Oct. 14, 1912.
 It is concluded that in the case of the development of the fungus *Mucor rouxii* there is no one optimum temperature, but optima which vary according to the medium in which the fungus develops.
- DUVEL, J. W. T. (579)
 THE VITALITY AND GERMINATION OF SEEDS. 96 p. Washington Govt. print. off., 1904. (U. S. Dept. Agr., Bur. Plant Indus. Bul. 58.)
 "The first factors determining the vitality of a seed are maturity, weather conditions at the time of harvesting, and methods of harvesting and curing. Seed harvested in damp, rainy weather is much weaker in vitality than seed harvested under more favorable conditions."
- EASTHAM, JOHN W. (580)
 AN UNUSUAL VASCULAR BROWNING OF POTATO TUBERS AS A RESULT OF FROST. (Abstract) Phytopathology 15: 731. Nov., 1925.
 Abstract of a paper presented at the ninth annual meeting of the Pacific division of the American Phytopathological Society, Corvallis, Oreg., June 22-24, 1925.
- (581)
 VASCULAR DISCOLORATION IN TUBERS FROM VINES KILLED BY FROST. Potato News Bul. 2: 108. Mar., 1925.
- EATON, FRANK M. (582)
 ASSIMILATION-RESPIRATION BALANCE AS RELATED TO LENGTH OF DAY REACTIONS OF SOYBEANS. Bot. Gaz. 77: 311-321. May, 1924.
 The author discusses the effect of different nightly temperatures on the time of flowering of Peking soybeans, cotton, red clover, lemon trees, potatoes, and maize.
- (583)
 CELL-SAP CONCENTRATION AND TRANSPIRATION AS RELATED TO AGE AND DEVELOPMENT OF COTTON LEAVES. Jour. Agr. Research 40: 791-803. May 1, 1930.
 "This paper deals with the interrelations between the concentration of cell sap and the rate of transpiration of cotton leaves as influenced by age and the relation of these factors to leaf development."
- and BELDEN, GALEN O. (584)
 LEAF TEMPERATURES OF COTTON AND THEIR RELATION TO TRANSPIRATION, VARIETAL DIFFERENCES, AND YIELDS. 39 p. Washington, D. C., 1929. (U. S. Dept. Agr. Tech. Bul. 91.)
 A study of the leaf temperatures of the two most important cotton varieties of the Southwest is made in connection with their exposure to high temperature, intense light, and low humidity.
- EBERHARDT, PH. (585)
 INFLUENCE DE L'AIR SEC ET DE L'AIR HUMIDE SUR LA FORME ET SUR LA STRUCTURE DES VÉGÉTAUX. Ann. Sci. Nat. Bot. (8) 18: 61-152. 1903.
 Abstract in Expt. Sta. Rec. 16: 643. 1904-5.
 "The author studies the effect of excessive drought and a saturated soil and atmosphere on the form and structure of a large number of species of plants."

- ÉBLÉ, M. L. (588)
 SUB LA CORRÉLATION ENTRE LA TEMPÉRATURE ET LA FLORAISON. *Météorologie* (n. s.) 2: 406-411. Sept., 1926.
 The author discusses the relation between temperature and the blooming period of a number of plants.
- EDELMAN, M., and HALL, W. S. (587)
 POTATO VARIETY TRIALS. *Farming in So. Africa* 1: 191-192. Sept., 1926.
 The relation of rainfall to crop yield is shown.
- EDGERTON, CLAUDE W. (588)
 EFFECT OF TEMPERATURE ON GLOMERELLA. *Phytopathology* 5: 247-259. Oct., 1915.
 The effect of temperature on 49 cultures of *Glomerella* from 22 different host plants is investigated.
- STORM DAMAGE TO CANE VARIETIES. *Planter and Sugar Manfr.* 77: 208-210. Sept. 11, 1926.
- and MORELAND, C. C. (590)
 TOMATO WILT. 54 p. Baton Rouge, 1920. (*La. Agr. Expt. Sta. Bul.* 174.)
 Contains observations on the effect of high and low temperature on fusarium wilt.
- EDSON, HOWARD A. (591)
 THE EFFECT OF FROST AND DECAY UPON THE STARCH IN POTATOES. *Jour. Indus. and Engin. Chem.* 10: 725-726. Sept. 1, 1918.
 "Frosted and decayed potatoes have been found . . . to be entirely capable of producing acceptable and frequently normal yields of clean, white starch of good quality."
- and SHAPOVALOV, M. (592)
 TEMPERATURE RELATIONS OF CERTAIN POTATO-ROT AND WILT-PRODUCING FUNGI. *Jour. Agr. Research* 18: 511-524. Feb. 16, 1920.
 It is shown that "a certain degree of correlation exists between the temperature relations of some potato fungi in pure cultures and their geographical distribution and seasonal occurrence."
- EFFECT OF A LATE SPRING UPON CROP YIELDS. Washington, D. C., 1917, p. 2-3, 5. (*U. S. Dept. Agr., Weather Bur. Natl. Weather and Crop Bul.* 11, series 1917.) (593)
 Diagrams show the relation between the temperature departure from the normal for the month of May and the yield of corn, oats, and cotton.
- THE EFFECT OF COLD ON PLANTS. *Gard. Chron.* 73 (1886): 85. Feb. 17, 1923. (594)
- THE EFFECT OF LIGHT EXPOSURE ON PLANT GROWTH. *Sci. Amer. Mo.* 3 (1): 78. Jan., 1921. (595)
 A brief account of the work of Garner and Allard.
- EFFECT OF WEATHER ON CROP GROWTH. *Times, London*, Sept. 25, 1930. (596)
 "A conference of workers engaged in the study of the various aspects of the effect of weather on crop growth has been arranged by the Ministry of Agriculture to take place to-day and to-morrow in the library of the Meteorological Office, Exhibition Road (adjoining Science Museum) South Kensington, S. W. 7. The chair will be taken by Sir Napier Shaw, F. R. S., and papers will be read dealing with such subjects as nocturnal radiation from the earth's surface; the effect of weather on sugar beet; fertilizers; insect life; and the effect of artificial illumination on poultry. The conference will be open to all interested in agricultural meteorology."
- EFFETS DU SIROCCO SUR LE VIGNOBLE TUNISIEN EN JUILLET 1916. *Dir. Gén. Agr. Com. et Colon. [Tunis.] Bul.* 20: 199-208. Sept.-Dec., 1916. (597)
 The author finds that the damage done to the Tunisian vineyards by the sirocco in July, 1916, was due in large measure to the long spring drought.
- EGASSE, CH. (598)
 IL FAUT REMPLACER TOUS LES BLÉS ATTEINTS PAR LA GELÉE. *Défense Agr.* 25: 61-62. Feb. 11, 1928.
 Farmers are advised to replace frosted wheat.
- EGHIS, SAMUEL A. (599)
 CONTRIBUTION TO THE QUESTION ON PHOTOPERIODISM WITH SOYBEANS AND CORN. *Detskosl'skaia akhlimatizatsionnaia Sta. (Labours of the Acclimation Sta.)* no. 9, p. 5-32. 1928. Pt. 9 is *Mem. Inst. Agron. Leningrad t. 5, livr. 2.*
 [English summary.]

- EHLERS, JOHN H. (600)
THE TEMPERATURE OF LEAVES OF PINUS IN WINTER. *Amer. Jour. Bot.* 2: 32-70. Jan., 1915.
This investigation was undertaken "to determine the effect of solar radiation upon the temperature of persistent leaves under winter conditions, and its possible bearing upon photosynthesis and the accumulation of reserve food material during the same season."
- EICHELBERGER, ROBERT. (601)
REGENVERTEILUNG, PFLANZENDECKE UND KULTURENTWICKLUNG IN DER OSTINDISCHEN INSELWELT. *Geogr. Ztschr.* 30: 103-116. 1924.
The distribution of rainfall and its effect upon the vegetation of the East Indies are discussed.
- ELLENWOOD, C. W. (602)
BLOOMING PERIOD AND YIELD OF APPLES—A 15 YEAR AVERAGE. 82 p. Wooster, 1925. Ohio Agr. Expt. Sta. Bul. 385.)
Tables show the blooming period and yield of 109 varieties of apples.
- ELLISON, ECKLEY S., and CLOSE, WILBUR L. (603)
CRITICAL SPRING TEMPERATURES FOR APPLES IN THE YAKIMA VALLEY, WASH. U. S. Mo. Weather Rev. 55: 11-18. Jan. 1927.
This study, based on observations covering a period of four spring seasons, shows that among the conditions which influence the damage caused to apples at different stages of development are the following: The temperature of the dew point; the duration of temperature at different temperature levels below 32°; the rate of rise in temperature after sunrise; the vitality of the individual tree. Different varieties of apples show different degrees of resistance to frost.
- ELSSMANN, EMIL. (604)
UEBER DIE PERIODIZITÄT BLUTENENTWICKLUNG BEI DEN OBSTGEHÖLZEN. *Landw. Jahrb.* 62: 539-606. 1925.
Periodicity of fruit trees is studied.
- EMERSON, ROLLINS A. (605)
CONTROL OF FLOWERING IN TEOSINTE. *Jour. Heredity* 15: 41-48. Jan., 1924.
The effect of daylight on flowering of teosinte is studied.
- (606)
THE RELATION OF EARLY MATURITY TO HARDINESS IN TREES. *Nebr. Agr. Expt. Sta. Ann. Rpt.* 19: 101-110. 1906.
- ENGBERG, RUSSELL C. (607)
INDUSTRIAL PROSPERITY AND THE FARMER. 286 p. New York, The Macmillan Co. 1927.
In his chapter on factors which affect production the author points out that "so far as short-time changes in agricultural production are concerned, the forces of nature probably play the leading rôle." The effect of weather on crop acreages and on dairy production is indicated. The effect of weather on wheat production is discussed briefly (p. 240-245).
- ENGLEDOW, F. L. (608)
CROPS AND PLANT-BREEDING. In *Roy. Agr. Soc. England. Agricultural Research* in 1926 (p. 1-35.). London, 1927.
The winter hardiness of crops is discussed (p. 20-34).
- ENQUIST, F. (609)
STUDIES OF CONTEMPORARY CHANGES IN CLIMATE AND VEGETATION [translated title]. *Svensk Geogr. Årsbok* 1929: 7-50.
In Swedish, with English abstract, p. 48-50. Abstract in *Expt. Sta. Rec.* 62: 712. June, 1930.
"It is stated that since 1915 the climate of southern Sweden has become more continental followed by reduced yields of winter wheat. 'In Sweden winters of a continental type are throughout followed by meager winter wheat crops, winters of a maritime type by excellent crops. The climatical conditions of the summer seem to modify the yield of crops only slightly.' It is suggested that this may furnish a basis for a method of predicting yields. In general, the author concludes that 'the limits of distribution of plants are determined, as far as temperature goes, by the duration of maximum and minimum temperatures.'"
- ENSTRÖM, AXEL F. (610)
[A SERIES OF ARTICLES] *Teknisk Tidskr. (Veckouplagen)*, 1916.
Not examined. Reference given as found.
"From the French synopsis of Wainstein's paper, supplemented by notes which Dr. Kuznets has made, I judge Enström's investigations to

ENSTRÖM, AXEL F.—Continued.

merit more attention than they have received. By repeated smoothing and differentiation of numerous time series, most of which run back to 1830, Enström finds nonsynchronous cycles of 8 to 9 years in wholesale prices, crops, production, temperature, and sunspots . . ." cf. Mitchell, Wesley C. Business Cycles, 1926, p. 475.

EREDIA, FILIPPO.

(611)

CORRELAZIONE TRA LA PRODUZIONE DEL FRUMENTO E L'ANDAMENTO ANNUALE DELLE PIOGGE IN SICILIA. Atti. R. Accad. Naz. Lincei, Rend. Cl. Sci. Fis., Mat. e Nat. (5) 32 (pt. 2, no. 10): 358-361. 1923.

Abstract in Expt. Sta. Rec. 52: 16. Jan., 1925.

The author "reports a qualitative study, without computation of correlation coefficients, of the relation between yields of grain and annual and seasonal rainfall for the period 1909-1923."

(612)

METEOROLOGY IN AGRICULTURE. Internatl. Rev. Agr. Pt. 1. Mo. Bul. Agr. Sci. and Pract. 21 (1): 1-3. Jan., 1930.

The importance of the study of atmospheric phenomena in relation to agriculture is stressed.

(613)

THE PERIODICITY OF METEOROLOGICAL FACTORS IN RELATION TO AGRICULTURE. Internatl. Rev. Sci. and Pract. Agr. [Rome] (n. s.) 1: 546-560. July-Sept., 1923.

The author discusses the work done by a number of recent investigators in connection with the problem of long-term weather forecasting and its relation to crops.

(614)

LA PREVISIONE DELL'ENTITÀ DEL PRODOTTO DEL MANDORLO DI UN'ANNATA IN BASE ALL'ANDAMENTO DELLA TEMPERATURA DELL'ARIA E DELLE PRECIPITAZIONI NEL TRIMESTRE GENNAIO-MARZO. Atti. R. Accad. Naz. Lincei, Rend. Cl. Sci. Fis., Mat. e Nat. (6) 1 (fasc. 9): 548-552. May, 1925.

A relation is shown between temperature and rainfall variations and the yield of almond trees.

ERIKSSON, JAKOB.

(615)

LANDTBRUKSBOTANISK BERÄTTELSE AF ÅR 1902. K. Landtbr.-Akad. Handl. och Tidskr. 1902: 112-134.

The results of observations on the winter hardiness of wheat made in Sweden from 1890 to 1901 are given.

ERMAN, C.

(616)

EIN BEITRAG ZU DEN UNTERSUCHUNGEN ÜBER DIE DUNKELWACHSTUMSREAKTION. The effect of darkness on the oat coleoptile is studied.

The effect of darkness on the oat coleoptil is studied.

ERWIN, ARTHUR T.

(617)

LATE POTATO BLIGHT EPIDEMICS IN IOWA AS CORRELATED WITH CLIMATIC CONDITIONS. Iowa Acad. Sci. Proc. 23: 583-592. 1916.

"Climatic conditions in Iowa are generally unfavorable to the development of *Phytophthora infestans*. The seasons in which it did occur were characterized by subnormal temperatures, high humidity, heavy dews, excessive rainfall and a predominance of cloudy weather."

(618)

LATE POTATO BLIGHT IN IOWA. p. 285-306. Ames, 1916. (Iowa Agr. Expt. Sta. Bul. 163.)

It is found that late potato blight in Iowa occurs when there is "a high degree of humidity with heavy dews and mid-summer temperatures lower than usual. An excess of rainfall and a predominance of cloudy weather are contributing factors."

and RUDNICK, R. A.

(619)

POTATO GROWING IN IOWA AS AFFECTED BY TEMPERATURE. p. 71-84. Ames, Iowa, 1922. (Iowa Agr. Expt. Sta. Bul. 206.)

"The white potato is distinctively a cool-season crop." High summer temperatures limit its production in the cornbelt. "The danger from frost injury at harvest time may be largely eliminated by early planting."

EUSTACE, H. J.

(620)

WINTER INJURY TO FRUIT TREES. p. 323-343. Geneva, 1905. (N. Y. State Agr. Expt. Sta. Bul. 269.)

This is a study of the damage done to fruit in New York State by the unusually cold weather of 1903 and 1904.

- EVANS, ROBERT J. (621)
THE EFFECT OF TEMPERATURE ON *STELLARIA MEDIA*. Amer. Breeders' Assoc. Ann. Rpt. 7-8: 205-212. 1912.
- EVERDINGEN, E. VAN. (622)
HET VERBAND TUSSEN DE WEERSGESTELDHEID EN DE AARDAPPELZIEKTE (*PHYTOPHTHORA INFESTANS*). Tijdschr. Plantenziekten 32 (af. 5): 129-140. May, 1926.
English summary.
"The author briefly discusses the negative result of an investigation by Dr. M. P. Löhnis on the relation between weather conditions and the occurrence of potato blight."
- EWERT, RICHARD. (623)
DIE ÜBERWINTERUNG VON SOMMERKONIDIEN PATHOGENER ASCOMYCETEN UND DIE WIDERSTANDSFÄHIGKEIT DERSELEEN GEGEN KÄLTE. Ztschr. Pflanzenkrank. 20: 129-141. Feb. 19, 1910.
The effect of cold weather on warm weather fungi. (624)
DIE WIDERSTANDSFÄHIGKEIT DER EINZELNEN ORGANE DER OBSTBLÜTE INSONDERHEIT DES BLÜTENPOLLENS GEGEN FROST. Ztschr. Pflanzenkrank. 20: 65-76. Feb. 5, 1910.
The resistance to frost of fruit blossom is discussed.
- EWING, E. C. (625)
A STUDY OF CERTAIN ENVIRONMENTAL FACTORS AND VARIETAL DIFFERENCES INFLUENCING THE FRUITING OF COTTON. 93 p. A. & M. College, 1918. (Miss. Agr. Expt. Sta. Tech. Bul. 8.)
The relation of weather and soil conditions to the rate of fruiting and shedding of cotton is discussed.
- FABRICIUS, LUDWIG. (626)
DIE SCHÄDEN DES WINTERWETTERS 1928/29 AN DEN FREMDLÄNDISCHEN HOLZARTEN DES FORSTLICHEN VERSUCHSGARTENS IN GRAFRATH BEI MÜNCHEN. Forstw. Centbl. 52 (2): 33-47. Jan. 15, 1930.
Damage by cold weather in 1928/29 to trees of foreign origin in the forestry experiment garden near Munich is discussed. A list of the trees affected is given.
- FAES, H. (627)
INFLUENCE DES CONDITIONS CLIMATÉRIQUES SUR LE DÉVELOPPEMENT DES INSECTES ET CHAMPIGNONS PARASITES DES CULTURES. Ann. Agr. Suisse 29(2): 221-228. 1928.
Studies of the development of mildew on vines at Lausanne from 1886 show that it is favored by rainy weather, atmospheric humidity, and high temperatures alternating with heavy rains.
- FAIRCHILD, DAVID. (628)
THE TESTING OF A NEW TREE CROP FOR HARDINESS. Jour. Heredity 9: 368-371. Dec., 1918.
An account of an experiment made with Mexican avocados at Brooksville, Fla., to test their resistance to spring frosts and to indicate suitable frost-protection measures.
- FARIS, JAMES A. (629)
COLD CHLOROSIS OF SUGAR CANE. Phytopathology 16: 885-891. Nov., 1926.
Investigations made on different varieties of sugar cane grown in Cuba indicate that "cold weather not preceded by rainfall to stimulate renewed growth may cause the appearance of slight chlorotic bands, while temperatures not quite so low but preceded by weather favorable for growth are followed by very marked chlorotic bands across the leaves."
- FARLEY, ARTHUR J. (630)
FRUIT TREES EXPERIENCE LOW TEMPERATURES AND SOME INJURY. N. J. State Hort. Soc. News 6 (1): 115. May., 1925.
A summary of reports on damage done to fruit trees in different sections of New Jersey by early frost in the spring of 1925. Among the fruit trees affected are apple, peach, sweet cherry, pear, and plum trees. Damage to strawberries is also mentioned.
- FARMER, JOHN B. (631)
FROST AND EVERGREENS. Gard. Chron. (3) 62 (1599): 72. Aug. 18, 1917.
Effect of stripping injured leaves from evergreens damaged by frost.

- FARMER, JOHN B.—Continued. (632)
ON CERTAIN RELATIONS BETWEEN THE PLANT AND ITS PHYSICAL ENVIRONMENT.
Jour. Roy. Hort. Soc. 40 (pt. 2): 197-207. Nov., 1914.
This article deals with the plant in its relation to its physical environment, including the factors of temperature and moisture.
- FARR, C. H. (633)
DORMANCY AND WINTER-KILLING OF PEACH BUDS. Iowa State Hort. Soc. Rpt. 55: 99-116. 1920.
- FASSIG, OLIVER J. (634)
THE PERIOD OF SAFE PLANT GROWTH IN MARYLAND AND DELAWARE. Bul. Amer. Geogr. Soc. 46: 587-590. Aug., 1914.
"The primary purpose of this paper is the determination of the best method of calculating the period of safe plant growth, and the normal length of the period in the states of Maryland and Delaware."
- FAULWETTER, R. C. (635)
DISSEMINATION OF THE ANGULAR LEAFSPOT OF COTTON. Jour. Agr. Research 8: 457-475. Mar. 19, 1917.
"Data have been obtained which point to the conclusion that wind-blown rain is an important factor" in the spread of this disease.
- WIND-BLOWN RAIN, A FACTOR IN DISEASE DISSEMINATION. Jour. Agr. Research 10: 639-648. Sept. 17, 1917. (636)
- FAWCETT, HOWARD S. (637)
INFLUENCE OF TIME AND TEMPERATURE ON THE RATE OF GROWTH OF CERTAIN FUNGI. (Abstract) Phytopathology 14: 119. Feb., 1924.
Abstract of a paper presented at the seventh annual meeting of the Pacific division of the American Phytopathological Society, Los Angeles, Calif., Sept. 18-21, 1923.
During an experiment made with two citrus-fruit-rotting fungi, both grew at average rates fluctuating along with the fluctuating temperatures.
- PRELIMINARY NOTE ON THE RELATION OF TEMPERATURE TO THE GROWTH OF CERTAIN PARASITIC FUNGI IN CULTURES. Johns Hopkins Univ. Circ. (n. s. 1917, no. 3) 293: 193-194. Mar., 1917. (638)
- RELATION OF TEMPERATURE TO GROWTH OF *PENICILLIUM ITALICUM* AND *P. DIGITATUM* AND TO CITRUS FRUIT DECAY PRODUCED BY THESE FUNGI. Jour. Agr. Research 35: 925-931. Nov. 15, 1927. (639)
"The investigation of these fungi in relation to temperature had for its purpose the gaining of information not only on the rate of growth from day to day on artificial media but also on the rate and percentage of decay produced in orange fruits. The results were found to show interesting differences in rate of decay between the stem end and the styler end of the fruit."
- SOME RELATIONS OF TEMPERATURE TO GROWTH AND INFECTION IN THE CITRUS SCAB FUNGUS *CLADOSPORIUM CITRI*. Jour. Agr. Research 21: 243-253. May 16, 1921. (640)
- TEMPERATURE EXPERIMENTS IN GERMINATING ORANGE SEEDS. Calif. Citrogr. 14: 515. Oct., 1929. (641)
Not seen.
- THE TEMPERATURE RELATIONS OF GROWTH IN CERTAIN PARASITIC FUNGI. Calif. Univ. Pub., Agr. Sci. 4: 183-232. May 20, 1921. (642)
and BARBER, W. R. (643)
- RELATION OF TEMPERATURE TO GROWTH OF *PENICILLIUM ITALICUM* AND *P. DIGITATUM* AND TO CITRUS FRUIT DECAY PRODUCED BY THESE FUNGI. (Abstract) Phytopathology 17: 746-747. Oct., 1927. (644)
Abstract of a paper presented at the eleventh annual meeting of the Pacific division of the American Phytopathological Society, Reno, Nev., June 23, 1927.
- FEDOROV, E. E. (644)
ESSAY ON A CONFRONTATION OF LENGTH OF A PLANT GROWING PHASE WITH WEATHER TYPES. Jour. Landw. Wiss. 4 (7-8): 429-438. 1927.

FEDOROV, E. E.—Continued.

In Russian, with English abstract. Abstract in Expt. Sta. Rec. 62: 114. Feb., 1930.

"This article discusses results of studies with rye from 1886 to 1919, inclusive. It supplements one previously noted (E. S. R. 60, p. 616) and indicates that a mean daily temperature of about 20° C. with a diurnal amplitude of 10° or more and a mean daily humidity of from 41 to 60 per cent are especially favorable to the growth of rye if not accompanied by droughts."

FIALHO, JOÃO DA SILVA.

(645)

CULTURA MODERNA DOS CEREAIS. INFLUÊNCIA EXERCIDA PELO CLIMA NA CULTURA DO TRIGO EM PORTUGAL. Bol. Assoc. Cent. Agr. Portug. 20: 288-295. Sept., 1918.

The author discusses the effect of temperature, rainfall, and light on the growth of wheat in Portugal.

FIELDING, W. L., and LINE, R.

(646)

AGRICULTURAL METEOROLOGICAL SCHEME. PRECISION RECORDS ON WHEAT AT WYE. Kent Southeast. Agr. Col., Wye, Jour. 25: 242-243. 1928. 26: 89-95. 1929.

Abstract in Expt. Sta. Rec. 61: 808. Abstract number, Dec., 1929.

"A plan of observations on the progress of germination, leaf formation, early tillering, dying of side tillers, ear emergence, and yield, as related to weather and other conditions is described, and the first year's results are reported. The plan is based on recommendations of the Agricultural Meteorological Committee of the Ministry of Agriculture and Fisheries."

LA FIÈVRE CYCLONIQUE DES PLANTES. Mauritius Chamber Agr. Bul. Agr. 2: 335-336. Feb., 1911.

(647)

The effect of cyclones on vegetation and particularly on sugar cane is discussed.

FIGDOR, WILHELM.

(648)

ÜBER DEN EINFLUSS DES LICHTES AUF DIE KEIMUNG DER SAMEN EINIGER GESNERIACEEN. Ber. Deut. Bot. Gesell. 25: 582-585. Jan. 27, 1908.

The author shows to what extent light is necessary for the germination of the seeds of the species studied.

FIGUEIREDO, FILIPE E. A.

(649)

CONTRIBUIÇÃO PARA O ESTUDO DO CLIMA NAS SUAS RELAÇÕES COM A AGRICULTURA. Jor. Sci. Mat. Fis. e Nat. (3) 2 (5): 29-32. Jan., 1919.

It is shown that there is an inverse ratio between the yield of wheat and the rainfall at the tillering period.

(650)

OBSERVAÇÕES E ESTUDOS EFECTUADOS NO LABORATÓRIO DE FÍSICA AGRÍCOLA E NO CAMPO EXPERIMENTAL DE METEOROLOGIA DO INSTITUTO SUPERIOR DE AGRONOMIA. DA INFLUÊNCIA DOS FENÔMENOS METEOROLÓGICOS NA CULTURA DO TRIGO. Bol. Assoc. Cent. Agr. Portug. 21: 251-264. Aug., 1919.

The author confirms a previous discovery of the existence of an inverse ratio between yield and rainfall during the growth of wheat.

FILTER, P., and LASCHKE, W.

(651)

VERGLEICHENDE UNTERSUCHUNGEN ÜBER DEN EINFLUSS VON TEMPERATUR UND AUFWERHUNGSART AUF DIE KEIMFÄHIGKEIT LAGERNDER SÄMEREIEN, Landw. Jahrb. 38: 759-766. Oct. 15, 1909.

Shows the effect of increased temperature on the germination of seeds in air-tight receptacles.

FILZER, PAUL.

(652)

UNTERSUCHUNGEN ÜBER WACHSTUMSREAKTION UND KRÜMMUNG BEI ACHSEN-PARALLELER LICHTRICHTUNG. Jahrb. Wiss. Bot. 70: 453-492. Apr., 1929.

A study of light and growth.

FINNELL, HENRY H.

(653)

THE DROUTH OF 1926-27 IN RELATION TO SOIL MOISTURE AND CROP YIELDS AT GOODWELL, OKLA. p. 9-23. Goodwell, Okla., 1929. (Panhandle Agr. Expt. Sta. Bul. 8.)

(654)

EFFECT OF WIND ON PLANT GROWTH. Jour. Amer. Soc. Agron. 20: 1206-1210. Nov., 1928.

"To secure further information of the importance of physical damage from wind, simple pot tests using wind as the sole variable factor were devised and preliminary results are reported here. Attention was given to providing comparable conditions of temperature, humidity, light, and moisture."

- FINNELL, HENRY H.—Continued. (655)
SOME EFFECTS OF WIND INJURY TO GROWING PLANTS. Okla. Acad. Sci. Proc. [Okla. Univ.] 9: 24-27. 1929.
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- WINDBREAKS. p. 13-14. Goodwell, Okla., 1929. (Panhandle Agr. Expt. Sta. Bul. 7.) (656)
Wind damage to growing plants and the need of windbreaks are noted.
- FIORI, ADRIANO. (657)
LA RESISTENZA DEL TRIFOLIUM SQUARROSUM AL FREDDO. Alpe [Florence] 13: 133-134. Apr., 1926.
Cold resistance in clover is discussed.
- FISCHER, H. W. (658)
GEFRIEREN UND ERFRIEREN, EINE PHYSICOHEMISCHE STUDIE. In Cohn Beiträge zur Biologie der Pflanzen, bd. 10, hft. 2, p. 133-234. 1911.
The effect of low temperatures on plants is studied.
- FISCHER, HUGO. (659)
DIE PFLANZE UND DAS LICHT. Gartenflora 78: 191-195. July, 1929.
The dependence of plants on light is stressed.
-
- ÜBER PERIODIZITÄT IM PFLANZENREICHE. Naturforscher 4: 271-275. Sept., 1927. (660)
The influence of light and temperature on plant periodicity is discussed.
-
- VERSUCHE ÜBER FROSTBESCHÄDIGUNG AN GETREIDE UND HULSENFRUCHTEN. Jahresber. Ver. Angew. Bot. 13 (pt. 2): 92-141. 1915. (661)
Frost damage to grain and legumes is studied.
- FISCHER, WALTER. (661a)
APPLES OF THE CORDILLERAS. Jour. Heredity 6: 357-361. Aug., 1915.
"The apple . . . reaches its greatest development in the regions of moderate rainfall . . . wherever there is some protection from the cold dry winds."
- FISHER, DURWARD F. (662)
WINTER INJURY. Wash. State Hort. Assoc. Proc. Ann. Meeting 16: 27-35. 1920.
Types of winter injury are discussed, as illustrated by its effects in 1919-20 on prunes, peaches, cherries, apples, pears, English walnuts, and filberts.
-
- WINTER INJURY TO FRUIT AND NUT TREES. Better Fruit 16 (6): 5-6, 18-19. Dec., 1921. (663)
- and BROOKS, CHARLES. (664)
DROUGHT SPOT AND RELATED PHYSIOLOGGICAL DISEASES. Agr. Jour. [Brit. Columbia] 5: 290-291, 293, 295. Dec., 1920.
Drought reactions on the fruit of the apple are studied.
- FISHER, R. A. (665)
THE INFLUENCE OF RAINFALL ON THE YIELD OF WHEAT AT ROTHAMSTED. Roy. Soc. [London], Phil. Trans. Ser. B 213: 89-142. 1925.
Reproduced in mimeographed form in [Gt. Brit.] Min. Agr. and Fisheries and Bd. Agr. Scotland. Agricultural Meteorological Scheme. Report on Agricultural Meteorological Conference, 1926 [London, 1926?], Appendix 2.
"By a special procedure involving the analysis of separate meteorological sequences it is possible to obtain an adequate mathematical expression of the average effects of the meteorological influences indicated by different instrumental observations at different times of the year . . . The rain data for Rothamsted have been analysed for 65 years . . . Rainfall changes account for only a portion of the slow changes observed in the yields."
-
- STUDIES IN CROP VARIATION. I. AN EXAMINATION OF THE YIELD OF DRESSED GRAIN FROM BROADBALK. Jour. Agr. Sci. [England] 11: 107-135. Apr., 1921. (666)
The author's findings "indicate that a perceptible proportion, nearly nine per cent of the variance of the mean yield is due to difference in the year's rainfall. A further point of interest in connection with this result is that the optimum rainfall derived from the deviations is about

FISHER, R. A.—Continued.

21 inches, that from the actual yields 17 inches, while for the polynomial value there is no optimum at all. This suggests that ideal conditions for the wheat plant on this soil require a rainfall about 21 inches, but that lower values though somewhat injurious to the plant, are of permanent value to the field by facilitating the eradication of weeds. If this be so, it illustrates a point to be borne in mind in considering the effect of weather upon crops, that the ideal weather for the plant is not necessarily ideal for the purpose of farm operations."

FLAHAULT, CHARLES. (667)

VENT ET NEIGE. Veröffent. Geobot. Forschungsinst. Rübel, Zurich. Hft. 3, p. 169-185. 1925. Festschrift Carl Schröter.

The effect of wind and snow on plants, and, in particular on trees, is discussed.

FLEROV, K. V. (668)

AGROCHEMICAL CHARACTERISTICS OF DROUGHT RESISTANT VARIETIES OF CULTIVATED PLANTS. Trudy Prikl. Bot. i Selekt. (Bul. Appl. Bot. and Plant Breeding) 23: 111-154. 1930.

In Russian with English summary.

FLORA, S. D., and BUSH, C. L. (669)

DAMAGE BY HAIL IN KANSAS. U. S. Mo. Weather Rev. 45: 359-361. July, 1917.

A table shows the average annual loss by hail to the wheat crop in the principal wheat-growing counties of Kansas. While it indicates that "the damage by hail is not always proportional to the amount of rain that falls during the harvest months, July and August, the losses of dry seasons . . . have been small, while those of the notably wet harvest seasons . . . have been heavy."

FOEX, ÉTIENNE. (670)

QUELQUES OBSERVATIONS SUR LES CONDITIONS QUI FAVORISENT LE DÉVELOPPEMENT ET L'EXTENSION DES ROUILLES DES CÉRÉALES. Rev. Path. Vég. et Ent. Agr. 11 (fasc. 1): 32-41. Jan.-Mar., 1924.

A brief discussion of the relation between weather conditions and the development of cereal rusts.

FORTUNATOVA, O. K. (671)

DEPENDENCE OF THE HEIGHT OF PLANTS ON THE GEOGRAPHICAL FACTORS OF GROWTH. Trudy Prikl. Bot. i Selekt. (Bul. Appl. Bot. and Plant Breeding) 19: 385-466. 1928.

In Russian with English summary.

Among the factors which influence variation in plant height are light, temperature, wind, moisture, and rainfall.

THE FOUR GREATEST CORN STATES. p. 2, 7. Washington, D. C., 1916. (U. S. Dept. Agr., Weather Bur. Nat. Weather and Crop Bul. 15, series 1916.) (672)

The preeminence of Indiana, Illinois, Iowa, and Missouri as corn-producing States is closely connected with the July rainfall.

FOWLER, JOHN S., and MARRIOTT, WILLIAM. (673)

OUR WEATHER. 131 p. London, J. M. Dent & Sons (Ltd.), 1912.

The economic importance of weather study is shown in the chapter on weather and agriculture. It is presented briefly and in popular form, primarily for the use of schools.

FRANCE, OFFICE NATIONAL MÉTÉOROLOGIQUE. (673a)

LES INFLUENCES MÉTÉOROLOGIQUES ET LA CULTURE DU BLÉ. 27 p. Paris, 1927.

Contains a brief discussion of the effect of weather on wheat yield and wheat diseases, for the information of meteorologists.

FRANK, ARTHUR. (674)

1924 INFORMATION ON WEATHER INJURY, MOSAIC AND OTHER DISEASES OF RASPBERRIES IN WESTERN WASHINGTON. Wash. State Hort. Assoc. Proc. Ann. Meeting 20: 128-135. 1924.

FRANKLIN, T. BEDFORD. (675)

THE EFFECT OF WEATHER CHANGES ON SOIL TEMPERATURES. Roy. Soc. Edinb. Proc. 40 (pt. 1): 56-79. 1919-20.

"It is possible that good results would be obtained by comparing the phenological returns of the last thirty years with the accumulated temperature underground above the growing temperature for each plant considered."

- FRANKLIN, T. BEDFORD—Continued. (676)
 METEOROLOGY AND AGRICULTURE. Jour. Scot. Met. Soc. (3) 18 (36): 76-83. 1919.
 The predominant action of the weather in connection with the annual fluctuations of the yield is noted.
- FRANZ, GOTTFRIED. (677)
 DIE PHAENOLOGIE DES WINTERROGGENS IN NIEDERLAND. SCHLESWIG-HOLSTEIN UND MECKLENBURG. Arch. Ver. Freunde der Naturgesch. Mecklenburg 67 (Abt. 1): 55-129. 1913.
 This is a study of weather conditions in the Netherlands, Schleswig-Holstein, and Mecklenburg from 1890 to 1910 and of their effect on winter rye.
- FRAZER, CALVIN. (678)
 THE FROST PROBLEM UP TO DATE. WHAT SCIENCE HAS LEARNED ABOUT A DISPUTED SUBJECT. Country Gent. 79 (8): 360, 392: Feb. 21, 1914.
 The author discusses briefly frost injury to plants and their frost resistance.
- FRIEDRICH, ERNST. (679)
 KLIMA UND PRODUKTQUALITÄTEN. Petermanns Mitt. Justus Perthes' Geogr. Anst. 70: 112-116, 159-163. 1924.
 Abstract in Expt. Sta. Rec. 52: 114. Feb., 1925.
 "This article reviews, with references, contributions bearing on the question of the influence of climatic conditions on a great variety of agricultural and other products and operations, including grape growing and the quality of wines, wheat, rye, barley, oats, corn, rice, sugar cane, sugar beets, indigo, tobacco, peanuts, chestnuts, oranges, olives, coffee."
- FRIEND, H. (680)
 PROBLEMS OF PLANT LIFE. VIII. PLANTS AND DROUGHT. Gard. Chron. (3) 86: 207-208. Sept. 14, 1929.
 Not seen.
- FROMME, F. D., and MURRAY, T. J. (681)
 ANGULAR-LEAFSPOT OF TOBACCO, AN UNDESCRIBED BACTERIAL DISEASE. Jour. Agr. Research 16: 219-228. Feb. 24, 1919.
 "Rainfall is an important aid to infection, and the development of the organism within the tobacco leaf is apparently dependent to a marked degree on those predisposing factors which promote a rapid, vigorous growth of the host."
- FROST AND THE PLANTS' AWAKENING. Gard. Chron. Amer. 24: 395-396. Jan., 1920. (682)
 A brief explanation of "the nature of the struggle whereby the plant escapes from the grip of winter, and something of the way in which a touch of frost helps it out of its prison."
- FROST AND THE PLANTS' AWAKENING. Gard. Chron. Amer. 24: 395-396. Jan., 1929. (U. S. Dept. Agr. Farmers' Bul. 1588.) (683)
 "The larger portion [of the bulletin] is given over to a discussion of the various methods and devices now being used for protection against frost, together with a chapter on temperatures injurious to plants, blossoms, and fruit."
- FRÜH, J. (684)
 DIE ABBILDUNG DER VORHERRSCHENDEN WINDE DURCH DIE PFLANZENWELT. 97 p. Zürich. [1902?]
 The effect of wind on vegetation is discussed.
- FRYER, JAMES R. (685)
 A COMPARISON OF SOME PHYSICAL PROPERTIES OF IMMATURELY FROSTED AND NON-FROSTED SEEDS OF WHEAT AND OATS. West. Canad. Soc. Agron. Proc. Ann. Meeting 2: 46-56. 1921. (686)
 INFLUENCE OF LIGHT AND OF FLUCTUATING TEMPERATURES ON THE GERMINATION OF POA COMPRESSA (L.). Sci. Agr. 2: 225-230. Mar., 1922.
 "Sunlight was found to be somewhat beneficial in germinating Poa compressa (L.). Daily fluctuating temperatures gave better results than steady temperatures. Daily fluctuations ranging between 16° C. and 35° C. are probably the best temperature conditions for germinating Poa compressa (L.)."

- GAIL, FLOYD W. (687)
 FACTORS CONTROLLING THE DISTRIBUTION OF DOUGLAS FIR IN SEMIARID REGIONS OF THE NORTHWEST. *Ecology* 2: 281-291. Oct., 1921.
 A study is made of the influence upon the Douglas fir of the evaporating power of the air, relative humidity, water content of the soil, temperature of the soil and air, wind, and light.
-
- OSMOTIC PRESSURE OF CELL SAP AND ITS POSSIBLE RELATION TO WINTER KILLING AND LEAF FALL. *Bot. Gaz.* 81: 434-445. June, 1926.
 "There is a consistent increase in the osmotic pressure of the cell sap of the non-deciduous trees and shrubs studied as the temperature becomes lower during the fall and winter months. There is no consistent increase in the osmotic pressure of the cell sap of the deciduous trees studied as the temperature becomes lower in September, October, and November . . . Reduced amount of light, due to cloudy weather, in both non-deciduous and deciduous plants studied, causes a decrease in the osmotic pressure of the cell sap." (688)
- GAIN, EDMOND. (689)
 ACTION DES TEMPÉRATURES ÉLEVÉES SUR LES GRAINES, ET MORPHOLOGIE DES PLANTES ISSUES D'EMBRYONS CHAUFFÉS DE 115° À 155° C. *Rev. Gén. Bot.* 39: 234-253, 306-329. 1927.
 Abstract in *Expt. Sta. Rec.* 59: 724. Dec., 1928.
 "Seeds of various plants withstand temperatures for prolonged periods at 60° and even above 100° C. without losing their ability to germinate and to develop as far as the flowering period."
-
- and GAIN, ANDRÉ. (690)
 DIFFÉRENCES THERMIQUES DE L'UBAC À L'ADRET D'UNE VALLÉE LACUSTRE. *Compt. Rend. Acad. Sci. [Paris]* 170: 191-194. Jan. 19, 1920.
 Abstract in *Internatl. Rev. Sci. and Pract. Agr. [Rome]* 11: 534. May, 1920.
 "The authors have carried out observations on the thermal differences to be found in summer in the climate of the east of France, between the two slopes of a lacustrine valley, running approximately from east to west."
- GANE, R. (691)
 THE CARBOHYDRATE CONTENT OF DETACHED, PARTIALLY SHADED LEAVES. *Leeds Phil. and Lit. Soc. Proc., Sci. Sect.* 1 (pt. 10): 497-505. July, 1929.
 Data obtained from experiments made with leaves of *Plantago media* and Hart's tongue fern "suggest that, whilst the concentration of sugar under a shaded strip of a leaf exposed to light does not rise so rapidly as in unshaded parts, the difference in concentration thus brought about is not an adequate explanation of the complete failure of starch to appear in the shaded strip."
- GANNETT, HENRY. (692)
 CERTAIN RELATIONS OF RAINFALL AND TEMPERATURE TO TREE GROWTH. *Bul. Amer. Geogr. Soc.* 38: 424-434. July, 1906.
 The two primary factors that affect the growth of trees are shown to be temperature and rainfall.
- GARCIA, FABIAN, and RIGNEX, J. W. (693)
 HARDINESS OF FRUIT-BUDS AND FLOWERS TO FROST. 52 p. State College, 1914. (*N. Mex. Agr. Expt. Sta. Bul.* 89.)
 "Three important factors that influence the amount of damage done by spring frosts are: the degree of killing temperature, the time of day at which it occurs, and the length of time the temperature remains below the danger point . . . On the whole, apples and pears seem to be more resistant than peaches and plums."
- GARD, MÉDÉRIC. (694)
 SUR LE DÉPÉRISSEMENT DES JEUNES NOYERS EN 1922. *Bul. Soc. Path. Vég. France* 9 (fasc. 4): 263-266. Oct.-Dec., 1922.
 The effect of frost on young walnut trees is described.
 See also *Compt. Rend. Acad. Sci. [Paris]* t. 175, no. 17. Oct. 23, 1922.
 Contains substantially the same article.
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- SUR LES CAUSES DE L'INFÉCONDITÉ DES NOYERS ET DE LA VIGNE EN 1926. *Ann. Epiphyties* 14: 132-162. Mar.-Apr., 1928.
 Some of the effects of the weather of the spring of 1926 on walnut trees and vines are indicated. (695)

GARDNER, F. E.

(696)

COMPOSITION AND GROWTH INITIATION OF DORMANT BARTLETT PEAR SHOOTS AS INFLUENCED BY TEMPERATURE. *Plant Physiol.* 4: 405-434. Oct., 1929.

A study of "the effect of temperature on some of the constituents which are ordinarily considered important in the metabolism of the plant and which may bear some relation to the termination of the rest period . . . The changes reported as the result of exposure to low temperature have not been established as necessary to the initiation of growth; however, growth did not take place in the absence of these changes."

GARDNER, VICTOR RAY, and others.

(697)

THE FUNDAMENTALS OF FRUIT PRODUCTION. 686 p. New York, McGraw-Hill Book Co., 1922.

Winter injury and frost protection, p. 264-389.

GARDNER, WRIGHT A.

(698)

EFFECT OF LIGHT ON GERMINATION OF LIGHT-SENSITIVE SEEDS. *Bot. Gaz.* 71: 249-288. Apr., 1921.

"An attempt has been made in this investigation to discover the fundamental relation of light to the germination of seeds, and to show just what light does to start germination."

GARNER, C. A.

(699)

STUDIES IN SWEET CORN GERMINATION IN RELATION TO THE EFFECTS OF MOISTURE CONTENT AND TEMPERATURE. *Amer. Soc. Hort. Sci. Proc.* 1923: 166-174.

"It was deemed advisable to determine if possible the manner in which low temperature and high percentage of moisture . . . affect the seed causing the suspension of vital activity, and finally death."

GARNER, WIGHTMAN W.

(700)

EFFECT OF LENGTH OF DAY ON GROWTH AND DEVELOPMENT OF PLANTS. *Internatl. Cong. Plant Sci. Proc.* 2: 1050-1055. 1926.

— and ALLARD, H. A.

(701)

EFFECT OF SHORT ALTERNATING PERIODS OF LIGHT AND DARKNESS ON PLANT GROWTH. *Science* (n. s.) 66: 40-42. July 8, 1927.Abstract in *Biol. Abs.* 3: 484. Apr.-June, 1929.

"With a total daily illumination of 12 hours, progressive shortening of the alternations of light and darkness resulted in decided decreases in growth of soybean, *Rudbeckia bicolor* L, and *Cosmos sulphureus* L. A minimum was reached with light-darkness alternations of about 1 minute, while further shortening of the alternation to 15 seconds gave decided improvement in growth. The 1-minute periods induced chlorosis. W. W. Garner."

— and ALLARD, H. A.

(702)

EFFECT OF THE RELATIVE LENGTH OF DAY AND NIGHT AND OTHER FACTORS OF THE ENVIRONMENT ON GROWTH AND REPRODUCTION IN PLANTS. *Jour. Agr. Research* 18: 553-606. Mar. 1, 1920.

Experiments with tobacco, soybeans and other plants show that the length of day is an important factor in the growth and development of plants, and that the relation between the length of day and the time of flowering is of great importance in crop yields.

— and ALLARD, H. A.

(703)

EFFECT OF THE RELATIVE LENGTH OF DAY AND NIGHT ON FLOWERING AND FRUITING OF PLANTS. *Smithsn. Inst. Ann. Rpt.* 1920: 569-588.

This is a less technical account of the work discussed in the *Jour. Agr. Research* 18: 555-606. Mar. 1, 1920.

— and ALLARD, H. A.

(704)

FLOWERING AND FRUITING OF PLANTS AS CONTROLLED BY THE LENGTH OF DAY. *U. S. Dept. Agr. Yearbook* 1920: 377-400. 1921.

Contains a discussion of the effect of lengthening or shortening the light period on the development of a number of plants.

— and ALLARD, H. A.

(705)

FURTHER STUDIES IN PHOTOPERIODISM, THE RESPONSE OF THE PLANT TO RELATIVE LENGTH OF DAY AND NIGHT. *Jour. Agr. Research* 23: 871-920. Mar. 17, 1923.

This paper confirms and extends the observations and conclusions recorded in an earlier paper, published in this journal, v. 18, p. 553-606, concerning the regulatory action of the relative length of day and night on flowering and fruiting.

- GARNER, WIGHTMAN W. and ALLARD, H. A.—Continued. (706)
 LOCALIZATION OF THE RESPONSE IN PLANTS TO RELATIVE LENGTH OF DAY AND NIGHT. *Jour. Agr. Research* 31: 555-566. Sept. 15, 1925
 The author describes the results of exposing different parts of the same plant to different periods of illumination.
-
- and ALLARD, H. A. (707)
 PHOTOPERIODISM, THE RESPONSE OF THE PLANT TO RELATIVE LENGTH OF DAY AND NIGHT. *Science* (n. s.) 55: 582-583. June 2, 1922.
 Contains a brief account of investigations made by the authors since the publication of their paper in *Jour. Agr. Research* 18: 553-606. Mar. 1, 1920, which show that various other features of plant activity are affected by length of daylight.
-
- BACON, C. W., and ALLARD, H. A. (708)
 PHOTOPERIODISM IN RELATION TO HYDROGEN-ION CONCENTRATION OF THE CELL SAP AND THE CARBOHYDRATE CONTENT OF THE PLANT. *Jour. Agr. Research* 27: 119-156. Jan. 19, 1924.
- GARTHWAITE, J. W. (709)
 LETTER ON FROST AND FROST PREVENTION. *U. S. Mo. Weather Rev.* 42: 571-572. Oct., 1914.
 The author offers a few suggestions with regard to the protection of citrus fruit against frost.
- GASSNER, GUSTAV. (710)
 ALTES UND NEUES ZUR FRAGE DES ZUSAMMENWIRKENS VON LICHT UND TEMPERATUR BEI DER KEIMUNG LICHTEMPFFINDLICHER SAMEN. *Ber. Deut. Bot. Gesell.* 33: 203-217. May 27, 1915.
 The relation of light and temperature to certain groups of seeds is discussed.
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- (711)
 BEITRÄGE ZUR FRAGE DER LICHTKEIMUNG. *Ztschr. Bot.* 7: 609-661. 1915.
 Abstract in *Expt. Sta. Rec.* 35: 524. Abstract number. Dec., 1916.
 "This is a series of preliminary studies including the latent influence of light on germination."
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- (712)
 BEITRÄGE ZUR PHYSIOLOGISCHEN CHARACTERISTIK SOMMER-UND WINTERANNUELLER GEWÄCHSE, INSBESONDERE DER GETREIDE-PFLANZEN. *Ztschr. Bot.* 10: 417-480. 1918.
 The effect of low temperature on germination and flowering of summer and winter crops is discussed.
-
- (713)
 BEOBSACHTUNGEN UND VERSUCHE ÜBER DEN ANBAU UND DIE ENTWICKLUNG VON GETREIDE-PFLANZEN IM SUBTROPISCHEN KLIMA. *Vereinigung Angew. Bot. Jahresber.* 8: 95-163. 1910.
 A study of the growth and development of cereals suitable for cultivation in Uruguay shows the importance of temperature in the early stages of development.
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- (714)
 DER EINFLUSS DES KLIMAS AUF DIE ERNTERESCHAFFENHEIT DES GETREIDES. *Mitt. Deut. Landw.-Gesell.* 40: 950-955. Dec. 12, 1925.
 The influence of climatic factors on the quality of the grain yield is discussed.
-
- (715)
 ÜBER EINEN FALL VON WEISSBLÄTTRIGKEIT DURCH KÄLTEWIRKUNG. *Ber. Deut. Bot. Gesell.* 33: 478-486. Nov. 25, 1915.
 A study of the effect of temperature on Uruguay oats.
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- (716)
 ÜBER KEIMUNGSBEDINGUNGEN EINIGER SÜDAMERIKANISCHER GRAMINEENSAMEN. *Ber. Deut. Bot. Gesell.* 28: 350-364, 504-512; 29: 708-722; 33: 203-217. 1910-11.
 A number of experiments are described showing the effect of temperature and light upon the germination of certain seeds, mostly of South American grains.
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- (717)
 ÜBER RHYTHMIK UND PERIODIZITÄT IN DER ENTWICKLUNG DER PFLANZE. *Naturw. Umschau Chem. Ztg.* 10: 161-169. Nov., 1921.
 A study of rhythm and periodicity in plant development.

- GAßNER, GUSTAV and GRIMME, C. (718)
BEITRÄGE ZUR FRAGE FROSTHÄRTE DER GETREIDEPFLANZEN. Ber. Deut. Bot. Gesell. 31: 507-516. 1913.
Contains a discussion of the resistance of cereal crops to frost. Experiments are made with rye.
- GATES, FRANK C. (719)
EVAPORATION IN VEGETATION AT DIFFERENT HEIGHTS. Amer. Jour. Bot. 13: 167-178. Mar., 1926.
Gives the results of a study of the rates of evaporation encountered by plants at various heights above ground level under various weather conditions from 1917 to 1922.
- (720)
LIGHT AS A FACTOR INDUCING PLANT SUCCESSION. Mich. Acad. Sci. Rpt. 13: 201-202. 1911.
- (721)
WIND BURN IN AMORPHOPHALLUS Bot. Gaz. 60: 414. Nov., 1915.
A case of wind burn at Los Baños is described.
- (722)
WINTER AS A FACTOR IN THE XEROPHILY OF CERTAIN EVERGREEN ERICADS. Bot. Gaz. 57: 445-489. 1914.
- GAUSSEN, H. (723)
PLUVIOSITÉ ESTIVALE ET PÉNÉTRATION DE LA VÉGÉTATION MÉDITERRANÉENNE DANS LES PYRÉNÉES FRANÇAISES. Ann. Géogr. 30: 249-256. July 15, 1921.
A comparison of rainfall charts with maps of vegetation shows that the determining factor in the presence of Mediterranean vegetation in the French Pyrenees is the dryness of the summer.
- GEDDES, A. E. M. (724)
WEATHER AND THE CROP YIELD IN THE NORTH-EAST COUNTIES OF SCOTLAND. Quart. Jour. Met. Soc. [London] 48: 251-268. July, 1922.
The author shows that the connection between cereals and the weather is more marked than it is in the case of root crops. "The weather of the preceding year seems to influence the yield of hay as much as that of the year of harvesting."
- GEORGIAN, D. G. (725)
HOW JACK FROST STIMULATES PLANT GROWTH. NOVEL EXPERIMENTS WHICH GO TO SHOW THAT CHILLING GOVERNS ALL VEGETABLE GROWTH. Sci. Amer. 126: 122. Feb., 1922.
A discussion of Doctor Coville's experiments.
- GERICKE, WILLIAM F. (726)
EFFECT OF LIGHT ON AVAILABILITY OF IRON TO WHEAT PLANTS IN WATER CULTURES. Bot. Gaz. 79: 106-108. Mar., 1925.
- (727)
INFLUENCE OF TEMPERATURE ON THE RELATIONS BETWEEN NUTRIENT SALT PROPORTIONS AND THE EARLY GROWTH OF WHEAT. Amer. Jour. Bot. 8: 59-62. Feb., 1921.
"It appears . . . that temperature is of prime moment in determining the mineral requirements for good germination and initial growth in [Marquis] wheat . . . and it seems safe to suppose that other climatic conditions may not be without influence."
- (728)
SOME RELATIONS OF MAINTAINED TEMPERATURES TO GERMINATION AND THE EARLY GROWTH OF WHEAT IN NUTRIENT SOLUTIONS. Philippine Jour. Sci. 38: 215-238. Feb., 1929.
The results are given of a study of the early growth of Marquis wheat at seven maintained temperatures.
- GERLACH. (729)
NÄHRSTOFFVERLUSTE DURCH NIEDERSCHLÄGE IN FEUCHTEN UND TROCKENEN JAHREN. Mitt. Deut. Landw.-Gesell. 43: 145-147. Feb. 18, 1928.
Translated in [Gt. Brit.] Min. Agr. and Fisheries and Bd. Agr. Scotland. Agricultural Meteorological Scheme. Mo. Crop Weather Rpts. v. 4, no. 6, Mar., 1928. [Mimeographed.]
The author discusses the manurial losses through rainfall in wet and dry years.

- GESLIN, H. (730)
LES GELÉES DE L'HIVER 1928-1929 AU CENTRE DE RECHERCHES AGRONOMIQUES DE
VERSAILLES. *Ann. Sci. Agron. Franç. et Étrang.* 46: 475-481. July-Aug.,
1929.
An account of the effect of the freezing temperatures of 1928-1929 on
grain.
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- SUR UNE RELATION EXISTANT ENTRE LES TROIS FACTEURS CLIMATIQUES; EAU,
CHALEUR, LUMIÈRE ET LE RENDEMENT DES BLÉS. *Compt. Rend. Acad.*
Agr. France. 16: 513-520. Apr. 9, 1930.
A brief study of the effect of rainfall, temperature, and insolation
on the yield of wheat.
- GEX, M. F. (732)
LES INTÉMPÉRIES DE L'ANNÉE ÉCOULÉE (NOVEMBRE 1918 À NOVEMBRE 1919) ET
LEURS CONSÉQUENCES SUR LES CULTURES ET L'ÉCONOMIE PASTORALE EN
SAVOIE. *Rev. Géogr. Alpine* 8 (fasc. 1): 147-176. 1920.
The author discusses the effect on the vegetation of Savoy of an
unusually prolonged cold and wet winter followed by a short, hot,
dry summer in 1918-19.
- GHOSE (GHOSH), MANMATHA NATH. (733)
FURTHER NOTES ON THE EFFECT OF CERTAIN CLIMATIC CONDITIONS ON THE
CYANOGENESIS OF JOWAR (*ANDROPOGON SORGHUM*.) *Agr. Jour. India* 16
(pt. 4): 381-387. July, 1921.
The effect of temperature, humidity, and sunlight on the cyanogenesis
of jowar is discussed.
-
- NOTES ON THE HYDROCYANIC ACID CONTENT OF JOWAR (*ANDROPOGON SORGHUM*).
Agr. Jour. India, 14 (pt. 1): 107-115. Jan., 1919.
"It would appear that the weather is mainly responsible for the
development of the poisonous elements in the jowar."
-
- OIL CONTENT OF CASTOR SEEDS AS AFFECTED BY CLIMATE AND OTHER CONDITIONS.
Agr. Jour. India, 19 (pt. 1): 81-82. Jan., 1924.
"Climate does not seem to exert any appreciable influence on the oil-
yielding properties of the crop, except so far as it affects proper develop-
ment of the seeds."
- GILBERT, BASIL E. (736)
INTERRELATION OF RELATIVE DAY LENGTH AND TEMPERATURE. *Bot. Gaz*
81: 1-24. Mar., 1926.
"The object of this investigation has been an attempt to determine the
importance of temperature in determining the time of initiation of flower
primordia in *Xanthium pennsylvanicum* . . . Temperature was found to
be a determining factor . . . This temperature effect, however, was
closely associated with a response to relative day length."
-
- THE RESPONSE OF CERTAIN PHOTOPERIODIC PLANTS TO DIFFERING TEMPERATURE
AND HUMIDITY CONDITIONS. *Ann. Bot. [London]*, 40: 315-320. Apr., 1926.
"It is suggested that the phenomena of response to relative day length
may be materially influenced by the particular temperature and humidity
conditions to which the plant may be subjected during its growth period.
In this experiment certain plants known to react to relative day length
were subjected to two sets of temperature and humidity conditions.
Marked results were obtained in the modification of the length of the
vegetative activity."
- GILCHRIST, D. A. (738)
SUMMER FROSTS AND THEIR EFFECTS ON SWEDES AND MANGELS IN THE NORTH
OF ENGLAND. *Nat. Hist. Soc. Northumberland, Durham, and Newcastle-*
upon-Tyne Trans. (n. s.) 1 (pt. 2): 293-298. 1904.
Reprinted in Armstrong Col., Newcastle-upon-Tyne. *Agr. Dept. Bul.*
2, June, 1905.
- GILMAN, J. C. (739)
CABBAGE YELLOWS AND THE RELATION OF TEMPERATURE TO ITS OCCURRENCE.
Ann. Missouri Bot. Gard. 3: 25-81. 1916.
A relatively high temperature is required to produce symptoms of this
disease.

- GRUS, L. (740)
 ÜBER DEN EINFLUSS SUBMERSER KULTUR AUF HELIOTROPISMUS UND FIXE LICHTLAGE. Sitzber. Akad. Wiss. Wien, Math. Naturw. Kl. (1) 116 (9): 1593-1651. Nov., 1907.
 A study of the effect of submersion on the light reaction of certain plants.
- GLADWIN, F. E. (741)
 WINTER INJURY OF GRAPES. p. 105-139. Geneva, 1917. (N. Y. State. Agr. Expt. Sta. Bul. 433.)
 The author discusses the injury to grape vines caused by low temperatures, which is due in large part to immaturity of the tissues.
 THE GLASSHOUSE PLANT AND ITS ENVIRONMENT: 1. IN RELATION TO HEALTH. Gard. Chron. 84: 481. Dec. 22, 1928. (742)
 This contains a summary of a paper read by Doctor Bewley before the association of economic biologists. The author stresses the necessity for the full consideration of all environmental factors in relation to their effect on the growth and development of the plant. In tomato culture light exposure must be considered in relation to temperature.
- GLEASON, HENRY ALLAN. (743)
 SOME EFFECTS OF EXCESSIVE HEAT IN NORTHERN MICHIGAN. Torreyia 17: 176-178. Oct., 1917.
- GLOYER, WALTER O., and GLASGOW, HUGH. (744)
 DEFOLIATION OF CHERRY TREES IN RELATION TO WINTER INJURY. 27 p. Geneva, 1928. (N. Y. State. Agr. Expt. Sta. Bul. 555.)
- GÖSELE, LOTHAR. (745)
 UNTERSUCHUNGEN ÜBER BEZIEHUNGEN ZWISCHEN WITTERUNG UND ERNTEERTRAG IN DER LANDWIRTSCHAFT. Landw. Jahrb. 68: 253-317. 1928.
 Experiments made at Hohenheim with wheat, barley, oats, and beets are the basis of a study of the relationship between weather conditions and crop yields.
- GOFF, EMMETT STULL. (746)
 THE INFLUENCE OF LIGHT ON THE LENGTH OF THE HYPOCOTYL IN INDIAN CORN. Science (n. s.), 13: 395. Mar. 8, 1901.
- GOLDSWORTHY, M. C. (747)
 STUDIES ON THE SPOT DISEASE OF CAULIFLOWER; A USE OF SERUM DIAGNOSIS. Phytopathology 16: 877-883. Nov., 1926.
 "The economic importance of the spot disease of cauliflower appears to be increasing in the San Francisco Bay region of California. Sharp frosts, especially during the latter part of the growing season, cause an injury which allows a greater amount of infection."
- GOMILEVSKII, V. J. (748)
 LATE SPRING FROSTS AND HOW TO CONTROL THEM. Internatl. Inst. Agr., Bur. Agr. Intel. and Plant Diseases Bul. 2: 1264-1265. June, 1911.
 Abstract of a Russian article on methods used in France and Germany to combat late spring frosts. "The temperature limit varies with the season and the locality under consideration."
- GONZALEZ, L. G. (749)
 SOME FREEZING STUDIES ON CELERY. Amer. Soc. Hort. Sci. Proc. 1926: 339-351.
 The main objects of this work were "to find the freezing point of at least a few varieties of celery grown under varying environmental conditions [and] to determine the relation, if any, of the freezing point to the premature seeding of certain varieties of celery."
- GOODSPEED, T. HARPER. (750)
 THE TEMPERATURE COEFFICIENT OF THE DURATION OF LIFE OF BARLEY SEEDS. Bot. Gaz. 51: 220-224. Mar., 1911.
 "The temperature coefficient of the duration of life of barley grains has been determined for the temperatures 55°-70° C., inclusive, and has been found to be about 11 for a temperature interval of 10°."
- GORDIAGIN, A. (751)
 ÜBER DIE WINTERLICHE TRANSPIRATION EINIGER HOLZGEWÄCHSE OSTRUSSLANDS. Bot. Centbl. Beihefte (Abt. I) 46 (Hft. 1): 93-118. June, 1929.
 A study of winter transpiration of trees in east Russia.

- GORDON, W. L. (752)
EFFECT OF TEMPERATURE ON HOST REACTIONS TO PHYSIOLOGIC FORMS OF PUCCINIA GRAMINIS AVENAE, ERIKSS. & HENN. Sci. Agr. 11: 95-103. Oct., 1930.
- GORIS, A., and DELUARD, H. (753)
INFLUENCE DES RADIATIONS SOLAIRES SUR LA CULTURE DE LA BELLADONE ET LA FORMATION DES ALCALOÏDES DANS LES FEUILLES. Compt. Rend. Acad. Sci. [Paris] 174: 188-190. Jan. 16, 1922.
The author finds that sunlight has a favorable effect on the growth of the leaves of the belladonna plant and that it increases the quantity of alcaloids which they contain.
- GORKE, H. (754)
ÜBER CHEMISCHE VORGÄNGE BEIM ERFRIEREN DER PFLANZEN. Landw. Vers.-Sta. 65: 149-160. 1906.
The effect of frost on the chemical composition of plants is discussed.
- Goss, R. W. (755)
EFFECT OF ENVIRONMENT ON POTATO DEGENERATION DISEASES. 40 p. Lincoln, 1924. (Nebr. Agr. Expt. Sta. Research Bul. 26.)
"High temperature is a greater factor in masking mosaic symptoms than low moisture or increased sunlight, altho under field conditions all 3 usually occur together."
- and PELTIER, GEORGE L. (756)
FURTHER STUDIES ON THE EFFECT OF ENVIRONMENT ON POTATO DEGENERATION DISEASES. 32 p. Lincoln, 1925. (Nebr. Agr. Expt. Sta. Research Bul. 29.)
It is shown that light has little or no effect upon the foliage symptoms of any of the diseases studied, but that the effects of air temperature are pronounced.
- GOULD, HARRIS P. (757)
THE RECORDING OF PHENOLOGICAL DATA FOR POMOLOGICAL USES. Soc. Hort. Sci. Proc. 1906: 40-43.
- GOURLEY, J. H. (758)
THE EFFECT OF SHADING SOME HORTICULTURAL PLANTS. Amer. Soc. Hort. Sci. Proc. 1920: 256-260.
This is a brief preliminary study of the effect of a reduction in the intensity of sunlight upon flower-bud formation in fruit trees.
- (759)
SOME FACTORS WHICH INFLUENCE COLOR OF FRUIT. Ohio State Hort. Soc. Proc. Ann. Meeting 63: 75-79. Feb., 1930.
Light and cool weather as factors in color are briefly discussed.
- and NIGHTINGALE, G. T. (760)
THE EFFECTS OF SHADING SOME HORTICULTURAL PLANTS. 22 p. Durham, 1921. (N. H. Agr. Expt. Sta. Tech. Bul. 18.)
The effect of shading apple, peach, and plum trees and tomato and strawberry plants is discussed. "In the majority of species studied the shading resulted in a delay in flowering of from a few days to more than a month."
- GOVOROV, L. I. (761)
THE DIVERSE CHARACTERS OF WINTER AND SPRING FORMS OF CEREALS IN CONNECTION WITH THE PROBLEM OF HARDINESS IN WINTER CROPS. Trudy Prikl. Bot. i Selekt. Bul. Appl. Bot. Plant Breeding 13: 525-559. 1922-23. In Russian. English summary p. 555-559.
- GRASOVSKY, AMIHUD. (762)
SOME ASPECTS OF LIGHT IN THE FOREST. Yale Univ. School Forestry Bul. 23. 53 p. 1929.
"A brief account of solar radiation and its physiological effect on plants . . . The general conclusion reached is that the intensity and quality of the light reaching the forest floor are not the determining factors in accounting for the presence or absence of reproduction in the fully stocked forest where the investigation was made."
- GRAVERT, ERICH. (763)
WAS LEHRT UNS DER TROCKENE SOMMER 1925? Pflanzenbau; Halbmonatsschr. Saatwesen, Anbau u. Pflege der Kultur-Pflanzen 2 (7): 109-110. Oct. 1, 1925.
Some effects of drought on grain are indicated.

GRAY, JOHN, and PEIRCE, GEORGE J.

(764)

THE INFLUENCE OF LIGHT UPON THE ACTION OF STOMATA AND ITS RELATION TO THE TRANSPIRATION OF CERTAIN GRAINS. *Amer. Jour. Bot.* 6: 131-155. Apr., 1919.

The conclusions reached by the authors of this study are that "the stomata of barley, wheat, oats, and rye plants open with light and close with darkness; increase or decrease in the amount of light, when it has reached a minimum intensity, will have a corresponding effect upon the width of the stomatal openings . . . The moisture, soil, and light requirements of the different species [of grains] are essentially alike, though not identical."

GREAT BRITAIN, MINISTRY OF AGRICULTURE AND FISHERIES AND DEPARTMENT OF AGRICULTURE FOR SCOTLAND.

(765)

AGRICULTURAL METEOROLOGICAL SCHEME. BIBLIOGRAPHY OF LITERATURE ON AGRICULTURAL METEOROLOGY. Bulletin no. 1. Dec., 1926.

Contains references to literature on agricultural meteorology which have appeared in the issues of the Monthly Crop Weather Report from Oct., 1924, to Sept., 1926. Bulletin 2. Mar., 1929, contains references to literature on agricultural meteorology which have appeared in the issues of the Monthly Crop Weather Report from Oct., 1926, to Sept. 1928. "It is proposed to issue this bibliographical bulletin every two years."

(766)

AGRICULTURAL METEOROLOGICAL SCHEME. CONFERENCE AT THE METEOROLOGICAL OFFICE . . . SOUTH KENSINGTON, LONDON . . . 1ST OCTOBER AND 2ND OCTOBER. 1925. PROCEEDINGS AT THE CONFERENCE. *Mo. Crop Weather Rpts.* Sept., 1925.

"A course of training for meteorological observers at Kew Observatory, arranged by the Meteorological Office in conjunction with the Ministry, was held from the 28th Sept. to the 1st Oct. . . . After the course at Kew, a conference was held at the Meteorological Office on Thursday afternoon, 1st Oct., and Friday, 2d Oct." An account (usually in summary form) is given of the papers read. This is the only account which has been found of what is evidently the first of the agricultural meteorological conferences, now established as an annual event at the Meteorological Office, South Kensington, London.

Among the papers submitted are the following:

BUTLER, E. J.

EFFECT OF METEOROLOGICAL CONDITIONS ON PLANT DISEASES.

The latter part of this paper appeared in *Internatl. Rev. Sci. and Pract. Agr.* [Rome] (n. s.) 3: 369-384. Apr.-June, 1925.

"The object of this paper is to stress the importance . . . of first establishing the temperature and humidity relations of the parasite and host, singly and together, and only then, with exact information thus gained seeking the correlation with meteorological data. . . For the purpose here indicated, not only the means but the duration of the daily extremes of temperature may be of the utmost importance, a low minimum, if sufficiently prolonged, being perhaps sufficient to start a parasitic attack."

JONES, MARTIN G.

EFFECT OF WEATHER ON OATS AT ABERYSTWYTH. Also in *Jour. Min.*

Agr. [Gt. Brit.] 33: 425-437. Aug., 1926.

The author concludes that "various types of oats respond very differently to the same seasonal conditions . . . due to their being in different growth stages when certain weather conditions prevail. Oat plants are more responsive to the weather conditions at certain critical stages than at other periods. Certain varieties are able to develop their normal grain under much colder conditions than others."

KEEN, B. A.

AGRICULTURAL METEOROLOGICAL WORK AT ROTHAMSTED, WITH SPECIAL REFERENCE TO SOIL TEMPERATURE AND DRAINAGE.

Also in *Jour. Min. Agr.* [Gt. Brit.] 33: 210-218. June, 1926.

TINCKER, M. A. H.

THE EFFECT OF LENGTH OF DAY UPON THE GROWTH AND REPRODUCTION OF SOME ECONOMIC PLANTS.

Reprinted in *Ann. Bot.* [London] 39: 721-754. Oct., 1925. q. v.

GREAT BRITAIN, MINISTRY OF AGRICULTURE AND FISHERIES AND DEPARTMENT OF AGRICULTURE FOR SCOTLAND—Continued. (767)

AGRICULTURAL METEOROLOGICAL SCHEME. REPORT ON AGRICULTURAL METEOROLOGICAL CONFERENCE, 1926. Held at the Meteorological Office, South Kensington . . . Sept. 30 and Oct. 1, 1926. [London, 1926?] [Mimeographed.]

The following papers are included:

BLACKMAN, V. H.

SOLAR RADIATION AND PLANT GROWTH, p. 23-25.

"It is probable that differences of crop-yield of different varieties may be partly due to their different efficiencies in the utilisation of solar radiation."

CLARK, J. EDMUND.

THE VALUE OF CO-ORDINATION IN PHENOLOGICAL OBSERVATIONS, p. 26-30.

CORLESS, R.

SOLAR RADIATION, p. 20-22.

Methods of measuring sunshine duration and solar radiation are described and brief reference is made to their effect on plant life.

EDEN, T.

TECHNIQUE OF CROP OBSERVATIONS, p. 17-19.

"The following characters can be recommended as giving promising results as a measure of performance of the plant: (1) the capacity of the plant to tiller; . . . (2) the character of the leaf; . . . (3) the total height of the plant."

ENGLEDOW, F. L.

ESSENTIALS OF THEORY AND POINTS OF PRACTICE IN CROP WEATHER WORK, p. 15-16.

— and OTHERS.

INVESTIGATION OF THE INFLUENCE OF WEATHER ON CROPS. Appendix I, p. 40-50.

"This report recommends two kinds of records on agricultural crops:

(a) Parish records; (b) precision records."

FISHER, R. A.

RAINFALL AND WHEAT YIELDS. Appendix 2, p. 51-53.

Reproduced from Roy. Soc. [London] Phil. Trans. Ser. B 213: 89-142. 1925.

GREGORY, F. G.

METEOROLOGICAL CONDITIONS AND THE GROWTH OF BARLEY, p. 8-14.

Experiments were made at the Rothamsted Experimental Station during the years 1921-1924 to determine the influence of day and night temperature and solar radiation on the growth of a single pure line of barley.

LEES, A. H.

THE INFLUENCE OF SUMMER RAINFALL ON THE FRUITING OF APPLES, p. 1-7.

A table shows the "relation of previous apple crops and summer rainfall to flower production and crops of next year: Long Ashton District" from 1906-1925. "One may say that in general dry summers are followed by a good crop and wet summers by a poor crop, while medium summers may be followed by either."

ROEBUCK, A.

THE VALUE OF PHENOLOGICAL OBSERVATIONS IN PRACTICAL AGRICULTURE, p. 31-37.

The author shows the value of a knowledge of the influence of weather conditions on plants so that the farmer may plan his operations accordingly. Growth curves for oats in 1925 and 1926 are given.

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AGRICULTURAL METEOROLOGICAL SCHEME. REPORT ON AGRICULTURAL METEOROLOGICAL CONFERENCE, 1927. Held at the Meteorological Office, South Kensington . . . Sept. 22 and 23, 1927 [London, 1927?]. [Mimeographed.]

The following papers are included:

GIBSON, W. S., and GOODWIN, W.

AN INVESTIGATION INTO THE LOSSES THAT OCCUR DURING THE STORAGE OF WHEAT IN RICKS, p. 19-30. Summarized in Jour. Min. Agr. [Gt. Brit.] 34: 1039-1040. Feb., 1928.

"The results suggest that when grain is stored in the stack under good average conditions the loss of weight is extremely small and probably does not exceed 1 per cent."

GREAT BRITAIN, MINISTRY OF AGRICULTURE AND FISHERIES AND DEPARTMENT OF AGRICULTURE FOR SCOTLAND—Continued.

STAPLEDON, R. G.

THE EFFECT OF METEOROLOGICAL CONDITIONS ON THE AMOUNT AND NUTRITIVE VALUE OF PASTURE AND HAY, p. 41-54.

Summarized in Jour. Min. Agr. [Gt. Brit.] 34: 1099-1101. Mar., 1928.

"The dominating meteorological influence on herbage production, on herbage in the aggregate, grasses, and clovers is undoubtedly rainfall. . . . Rain on a warm soil . . . the outcome of a run of hot days preceding rain, undoubtedly to a marked degree makes for herbage production . . . The influence of weather conditions on hay yields has been extensively studied in Sweden, and Witte, for instance, concludes that the yield is chiefly influenced by the amount of rain falling from the time the herbage starts to make really active growth in the spring until the crop is cut—the starting date in the spring being very largely influenced by temperature."

WOODMAN, H. E.

THE EFFECT OF METEOROLOGICAL CONDITIONS ON THE RATE OF GROWTH OF PASTURE GRASS, p. 55-69.

Summarized in Jour. Min. Agr. [Gt. Brit.] 34: 1101-1103. Mar., 1928.

The results are given of two investigations carried out at Cambridge on two different types of permanent pasture during the years 1925 and 1926. The influence of total rainfall and the distribution of rainfall over the season, of changes in day and night temperature, and of hours of sunshine is considered.

(769)

AGRICULTURAL METEOROLOGICAL SCHEME. REPORT ON AGRICULTURAL METEOROLOGICAL CONFERENCE, 1928. Held at the Meteorological Office, South Kensington. . . . Sept. 27 and Sept. 28, 1928. [London, 1928?] [Mimeographed.]

The following papers are included:

BLACKABY, J. H.

THE EFFECT OF WEATHER CONDITIONS ON THE MOISTURE CONTENT OF CEREALS DURING HARVESTING, p. 11.

This is a résumé of a paper presented to the conference dealing with measurements made in connection with the prospective and actual use of a "combine-harvester" in Great Britain. "Figures of moisture content for wheat and barley left standing after the rest of the crop had been cut during the wet harvest of 1927 showed that even during periods of 19 days when 1.48 and 4.65 inches of rain fell on wheat and barley, respectively, there were several occasions when the values were such as to permit threshing on the field."

FAGAN, T. W.

THE EFFECT OF WEATHER AT HARVEST TIME ON THE CHEMICAL COMPOSITION OF HAY, p. 1-10.

Some of the effects of weather at harvest time on the chemical composition of hay are discussed. The author points out that "others of perhaps equal if not of greater importance have not been mentioned, such as the effect of weather at harvest time on the aroma, color, and other general characteristics associated with hay of good quality."

LEES, A. H.

METEOROLOGICAL CONDITIONS AND PESTS AND DISEASES OF FRUIT, p. 31-36.

The author concludes "that weather conditions have a direct effect on both fungus diseases and insect pests of fruit trees; that the indirect effect through the plant is perhaps more common; that wet years are on the whole favourable to fungus diseases and dry years to insect pests; that in some cases of fungus diseases it is possible for the grower to alter the internal condition of the plant so as to increase its resistance to disease."

STANILAND, L. N.

THE EFFECT OF WEATHER IN CONNECTION WITH TAR DISTILLATE SPRAYING, p. 27-29.

"The evidence, from all sources, strongly suggests that rain following the application of a tar-distillate wash, even if dry weather follows for 24 hours, causes a lowering of the effectiveness of the wash." This action appears to be due to the direct washing action of the rain.

GREAT BRITAIN, MINISTRY OF AGRICULTURE AND FISHERIES AND DEPARTMENT OF AGRICULTURE FOR SCOTLAND—Continued.

VYVYAN, M. C.

THE EFFECT OF CLIMATIC CONDITIONS ON THE GROWTH OF VEGETABLES, p. 13-25.

This is a brief report of some of the results obtained from a series of experiments on the effect of weather conditions on the growth of radishes, peas, and kidney beans.

GREAT DROUGHT OF 1921 AND ITS EFFECT ON GARDEN PLANTS. [SYMPOSIUM] Gard. Chron. (3) 71: 8-9, 18-19, 32, 44-45, 56, 80, 105, 286. 1922. (770)

GREATOREX, H. A.

FROST DAMAGE IN EAST ANGLIA. Garden 90: 102. Feb. 13, 1926. (771)

GREEN, W. J. and BALLOU, F. H.

WINTER-KILLING OF PEACH TREES. REPORT OF INVESTIGATIONS IN THE LAKE ERIE FRUIT BELT. p. 115-134. Wooster, 1904. (Ohio Agr. Expt. Sta. Bul. 157.) (772)

GREENE, LAURENZ.

1917 AND 1918 WINTER INJURY TO APPLE TREES. Iowa State Hort. Soc. Rpt. 53: 119-123. 1918. (773)

GREGORY, CHARLES T.

THE RELATION OF RAIN TO THE FORMALDEHYDE TREATMENT OF ONION SMUT. Phytopathology 12: 155-156. Mar., 1922. (774)

"It would seem that the application of formaldehyde will not be as effective if made during rainy periods."

(775)

WINTER INJURIES TO TREES AND SHRUBS. Better Homes and Gard. 4 (4): 15, 33. Dec., 1925.

— and BEESON, K. E.

SOME ASPECTS OF FREEZING INJURY TO WHEAT IN INDIANA IN 1925. Jour. Amer. Soc. Agron. 18: 444-446. May, 1926. (776)

Discusses types of frost injury and the response of different varieties of wheat.

GREGORY, F. G.

THE EFFECT OF CLIMATIC CONDITIONS ON THE GROWTH OF BARLEY. Ann. Bot. [London] 40: 1-26. Jan., 1926. (777)

The effect of temperature and sunshine on the growth of barley is studied.

(778)

STUDIES IN ENERGY RELATIONS OF PLANTS. II. THE EFFECT OF TEMPERATURE ON INCREASE OF AREA OF LEAF SURFACE AND IN DRY WEIGHT OF CUCUMIS SATIVUS. PT. 1. THE EFFECT OF TEMPERATURE ON THE INCREASE OF AREA OF LEAF SURFACE. Ann. Bot. [London] 42: 469-507. Apr., 1928.

"Experiments are described in which cucumbers are grown under constant conditions of continuous light and humidity at five different constant temperatures . . . The relation of leaf growth to the factors of light and temperature is discussed."

GRESSLE, C. A.

LIGHT AND THE FLOWERING AND FRUITING OF PLANTS. Florists' Exch. 61: 842-843. Mar. 6, 1926. (779)

GRIMALDI, CLEMENTE.

SUR LA RÉSISTANCE DE QUELQUES VIGNES AMÉRICAINES CONTRE LA SÉCHERESSE. 4 p. Paris, Société anonyme de publications périodiques, 1900. (780)

Drought resistance of some American vines is noted.

GROHMANN.

DER EINFLUSS DER WITTERUNG AUF DEN ERTRAG DER ZUCKERRÜBEN NACH MENGE UND GÜTE. Deut. Landw. Presse 31 (11): 83-84. Feb. 6, 1904. (781)

In sugar-beet production the factor that has most influence on quantity is rainfall, whereas sunshine and temperature influence the sugar content.

(782)

VORSCHLÄGE ZUR BEWERTUNG DES WETTERS BEI ANBAU-UND DÜNGUNGSVERSUCHEN UND BEIM LANDWIRTSCHAFTLICHEN PFLANZENBAU ÜBERHAUPT. Mitt. Deut. Landw. Gesell. 25: 427-433. July 9, 1910.

Abstract in Expt. Sta. Rec. 24: 15-16. Jan., 1911.

"The number of hours of sunshine and the total annual rainfall at Chemnitz for a period of ten years, beginning with 1895, are recorded, and the influence of these factors on winter wheat, winter rye, oats, barley, and potatoes is studied. Sunshine and precipitation are taken as the determining climatic factors."

- GROSSE, W. (783)
EINFLUSS VON TEMPERATUR UND NIEDERSCHLAG AUF DIE VEGETATION. Met.
Ztschr. 43: 352-355. Sept., 1926.
The influence of temperature and rainfall on vegetation is discussed.
- GROSSENBACHER, JOHN GASSEE. (784)
CROWN-ROT, ARSENICAL POISONING AND WINTER INJURY. p. 369-411. Geneva,
1909. (N. Y. Agr. Expt. Sta. Tech. Bul. 12.)
- GROVES, JAMES FREDERICK. (785)
TEMPERATURE AND LIFE DURATION OF SEEDS. Bot. Gaz. 63: 169-189. Mar.,
1917.
Experimenting with wheat of the Turkey-red variety, the author has
"sought to determine the extent to which a study of the laws of the life
duration of seeds at high temperatures (50-100° C.) will explain the
process of degeneration of air-dried seeds at ordinary storage tempera-
tures." A table shows the life duration of wheat seeds with 9 per cent
moisture at various temperatures.
- GROWTH OF TREES IN THE FOREST OF DEAN IN RELATION TO RAINFALL. Met. Mag.
[London] 63 (746): 29-33. Mar., 1928. (786)
Reprinted in U. S. Mo. Weather Rev. 56: 186-187. May, 1928.
An attempt is made to correlate tree growth with rainfall from a
study of measurements of annual rings of yews, oaks, and beeches in the
forest of Dean. The results would seem to indicate that it is doubtful
whether the history of the rainfall can be deduced from the annual rings
of trees in Britain as has been done in Western America.
- A "GROWTH SUBSTANCE" AND PHOTOTROPIC RESPONSE IN PLANTS. Nature [Lon-
don] 122: 928-930. Dec. 15, 1928. (787)
This article, signed J. H. P., discusses an article by Dr. F. W. Went,
Wuchsstoff und Wachstum, published in the Rec. Trav. Bot. Néerland.
25: 1-116, 1928, in which the author "starting from the phototropic
problem, has ended by contributing rather to the more general problem—
the nature of the mechanism involved in normal growth." The subject
of investigation is the oat coleoptile.
- GRUSS, E. W. (788)
PROTECTING TRUCK AGAINST FROST. U. S. Mo. Weather Rev. 39: 1231-1232.
Aug., 1911.
"Potatoes may be covered up or smudged, but the other spring crops
should have absolute protection, because even a strong, raw wind will
injure and, in many instances, kill them." (789)
- PROTECTION AGAINST FROST. U. S. Mo. Weather Rev. 39: 581-582. Apr., 1911.
The author discusses the damage done to fruit in Texas by frost and
methods of preventing it.
- GUILLET, CEPHAS. (790)
RELATIONSHIP BETWEEN THE WEATHER AND PLANT GROWTH; A COMPARATIVE
STUDY OF THE LAST TWO SPRINGS. Ottawa Nat. 18 (2): 40-54, May, 1904
The results are given of observations made near Ottawa in the spring
of 1902 and that of 1903 which illustrate the dependence of plant growth
upon temperature and rainfall.
- GULIK, D. VAN. (791)
NACHTVORST EN HAAR BESTRIJDING. Landbouwk. Tijdschr. 42: 156-164.
Apr., 1930.
Methods of frost protection are discussed.
- GUNDERSON, A. J. (792)
THE PRUNING OF WINTER-INJURED PEACH TREES. Amer. Soc. Hort. Sci. Proc.
1918: 32-38.
The effect of unusually low temperatures of 1917-18 on peach trees in
Illinois is studied.
- GUTHRIE, JOHN D. (793)
EFFECT OF ENVIRONMENTAL CONDITIONS ON CHLOROPLAST PIGMENTS. Amer.
Jour. Bot. 16: 716-746. Nov., 1929.
- GUTZEIT, ERNST. (794)
DAUERENDE WACHSTUMSHEMMUNG BEI KULTURPFLANZEN NACH VORÜBERGEHEN-
DER KÄLTEINWIRKUNG. Arb. Biol. Reichsanst. Land-u. Forstw. 5: 449-
468. 1907.
A study of the effect of frost on the growth of certain cultivated plants.

- GUTZEIT, ERNST—Continued. (795)
 VERSUCHE ÜBER DAS SCHOSSEN DER RÜBEN UND ANDERER PFLANZEN. Mitt. Biol. Reichsanst. Land-u. Forstw. Hft. 6, p. 20-23. Mar., 1908.
 Experiments made with beets and other plants convinced the author that low temperatures during germination and early growth favor stem formation.
- HA SOFFERTO IL GELSO PER GLI ECCEZIONALI FREDDI? Bul. Agr. Gior. Soc. Agr. Lombardia, Milan 63 (11): 1-2. Mar. 15, 1929. (796)
 This article, signed L. M., discusses briefly the effect of extreme cold on the mulberry tree.
- HAAS, ALBERT R. C., and REED, H. S. (797)
 RELATION OF DESICCATING WINDS TO FLUCTUATIONS IN ASH CONTENT OF CITRUS LEAVES AND PHENOMENON OF MOTTLE-LEAF. Bot. Gaz. 83: 161-172. Apr., 1927.
- HAASIS, FERDINAND W. (798)
 FROST HEAVING OF WESTERN YELLOW PINE SEEDLINGS. Ecology 4: 378-390. Oct., 1923.
 The author discusses the damage suffered by pine seedlings from frost heaving. The "amount of damage is dependent upon temperature, moisture, ground cover, shade, and plant anatomy."
- HABERLANDT, GOTTLIEB. (799)
 BLATTEPIDERMIS UND LICHTPERZEPTION. Sitzber. Preuss. Akad. Wiss. 32: 672-687. June 22, 1916.
 A study of the effect of light on leaves.
- HAFENRICHTER, A. L. (800)
 RESPIRATION OF THE SOYBEAN. Bot. Gaz. 85: 271-298. May, 1928.
 The influence of temperature on the degree and rate of respiration of two varieties of soybeans is discussed.
- HAINES, F. M. (801)
 THE SIGNIFICANCE OF THE "DROUGHT RESISTIVITY" AND "EFFECT", WITH SPECIAL REFERENCE TO THE VALUES OBTAINED FOR CERTAIN HEATH PLANTS ON HINDHEAD COMMON. Ann. Bot. [London] 42: 823-854. Oct., 1928.
- HALL, A. D. (802)
 AGRICULTURAL METEOROLOGY AS A FIELD FOR INVESTIGATION. Internatl. Rev. Sci. and Pract. Agr. [Rome] (n. s.) 1: 272-280. Apr.-June, 1923.
 The author discusses three methods of investigation of the effect of weather on crops and illustrates his remarks with references to articles by well-known scientists.
- HALL, CONSTANT J. J. VAN. (803)
 SUNLIGHT AND FUNGI. Agr. Soc. Trinidad and Tobago Proc. 10: 406-413. 1910. (Society Paper 436.)
- HALL, DANIEL. (804)
 THE STUDY OF WEATHER AND CROPS. Met. Mag. 57: 149-151. July, 1922.
 Contains a brief summary of some of the difficulties encountered in an investigation of the correlation of crop production with meteorological data.
- HALLENBECK, CLEVE. (805)
 FROST-FIGHTING IN THE PECOS VALLEY. U. S. Mo. Weather Rev. 51: 25-28. Jan., 1923.
 Describes measures taken to protect apple orchards from frost in the Pecos Valley of New Mexico.
- (806)
 MINIMUM TEMPERATURES SUSTAINED BY APRICOTS DURING MARCH, 1919, IN THE PECOS VALLEY, N. MEX. U. S. Mo. Weather Rev. 47: 240. April, 1919.
 To illustrate the observation that "in the semiarid and elevated regions of the West fruit blossoms and other tender vegetation will withstand temperatures that would kill all or nearly all growing vegetation in the lower and more humid districts of the eastern half of the United States," figures are given illustrating a remarkable case of resistance of apricots to temperatures below freezing after a period of low atmospheric humidity.
- HALMA, FREDERICK F., and FAWCETT, H. S. (807)
 RELATION OF GROWTH OF HELMINTHOSPORIUM SACCHARI TO MAINTAINED TEMPERATURES. Phytopathology 15: 463-469. Aug., 1925.

- HALMA, FREDERICK F., and HAAS, A. R. C. (808)
EFFECT OF SUNLIGHT ON SAP CONCENTRATION OF CITRUS LEAVES. Bot. Gaz. 86: 102-106. Sept., 1928.
"The great variation in sap concentration of citrus leaves brought about by direct sunlight indicates that large errors may result through indiscriminate sampling."
- HALSTED, BYRON D. (809)
THE EFFECT OF A MIDSUMMER DROUGHT UPON LIGNEOUS PLANTS. N. J. Agr. Expt. Sta. Ann. Rpt. 31: 265-273. 1910.
- _____. (810)
FUNGI AS RELATED TO WEATHER. N. J. Agr. Expt. Sta. Rpt. 19: 359-370, 1898; 20: 418-419, 1899; 21: 475-476, 1900; 22: 440-442, 1901; 23: 417-418, 1902; 24: 536-551, 1903; 25: 535-551, 1904; 26: 510-516, 1905.
- HAMBERG, H. E. (811)
DIE SOMMERNACHTERÖSTE IN SCHWEDEN 1871-1900. K. Svenska Vetensk. Akad. Handl. (N. F.) Bandet 38, no. 1, 94 p. 1904.
The author discusses the effect of frost on various crops in Sweden.
- HAMRICK, ANDREW M. (812)
FRUIT-FROST WORK IN THE GRAND VALLEY OF COLORADO. U. S. Mo. Weather Rev. 49: 549-553. Oct., 1921.
A study of methods used to combat the damage done by frost to orchards in the Grand Valley of Colorado.
- HANAMANN, JOSEF. (813)
DER EINFLUSS DER METEOROLOGISCHEN FAKTOREN AUF DAS GEDEIHEN DER ZUCKER-RÜBE UND BRAUERGESTE. Ztschr. Landw. Versuchsw. Österr. 4: 1073-1112. 1901.
The influence of weather conditions on the growth of sugar beets and barley is discussed.
- HANNA, W. F. (814)
GROWTH OF CORN AND SUNFLOWERS IN RELATION TO CLIMATIC CONDITIONS. Bot. Gaz. 78: 200-214. Oct., 1924.
Experiments were made to study the effect on the growth of corn and sunflowers of temperature, relative humidity, precipitation, and sunshine. The growth of both plants showed a greater correlation with temperature than with any other climatic factor.
- _____. (815)
THE NATURE OF THE GROWTH RATE IN PLANTS. (A REVIEW.) Sci. Agr. 5: 133-138. Jan., 1925.
Includes a brief account of the effect of precipitation, light, atmospheric humidity, and temperature on plant growth.
- HANNIG, EMIL. (816)
ÜBER HYGROSKOPISCHE BEWEGUNGEN LEBENDER BLÄTTER BEI EINTRITT VON FROST UND TAUWETTER. Ber. Deut. Bot. Gesell. 26a: 151-166. Mar. 26, 1908.
A brief study of the effect of frost on leaf movements.
- HANSEN, ADOLPH. (817)
ABWEHR UND BERICHTIGUNG DER ENGLER'S BOT. JAHRE., BD. 34, HFT. 4/5, 1902, VON PROF. E. WARMING AUS KOPENHAGEN VERÖFFENTLICHTEN "ANMERKUNGEN" ZU MEINER ARBEIT ÜBER DIE VEGETATION DER OSTFRIESISCHEN INSELN. Bot. Jahrb. Systematik, Pflanzengeschichte u. Pflanzengeographie 32 (Beibl. 71): 1-24. 1903.
Reply to Doctor Warming's criticism of his book and defense of his statements with regard to the effect of wind on plants. (cf. Warming, Eugenius.)
- _____. (818)
EXPERIMENTELLE UNTERSUCHUNGEN ÜBER DIE BESCHÄDIGUNG DER BLÄTTER DURCH WIND. Flora 93: 32-50. 1904.
The results are given of experiments to test the damage done to leaves by wind.
- HANSON, HERBERT C. (819)
LEAF-STRUCTURE AS RELATED TO ENVIRONMENT. Amer. Jour. Bot. 4: 533-560. Nov., 1917.
The author gives the results of an investigation into the differences in the structure of leaves growing in the sun at the south periphery and of leaves growing in the shade at the center of the same tree. The factors of environment studied are light, evaporating power of the air, temperature, humidity, and wind.

- HARDER, RICHARD. (820)
 ÜBER DIE ASSIMILATION VON KÄLTE- UND WÄRMEINDIVIDUEN DER GLEICHEN
 PFLANZENSPESIES. Jahrb. Wiss. Bot. 64: 169-200. 1924.
 This is a study of plant assimilation at different temperatures under
 conditions of equal light intensity.
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 ÜBER DIE REAKTIONEN FREIBEWEGLICHER PFLÄNZLICHER ORGANISMEN AUF
 PLÖTZLICHE ÄNDERUNGEN DER LICHTINTENSITÄT. Ztschr. Bot. 12: 353-462.
 1920.
 A study of the effect of sudden changes of light intensity on plant
 movement.
- HARLAN, HARRY V., and SHAW, F. W. (822)
 BARLEY VARIETY TESTS AT A HIGH-ALTITUDE RANCH NEAR OBSIDIAN. Jour.
 Amer. Soc. Agron. 21: 439-443. April, 1929.
 The effect of frost on different varieties of barley is briefly discussed.
- HARLER, C. R. (823)
 METEOROLOGICAL OBSERVATIONS IN ASSAM. THE TEA CROP AND THE WEATHER.
 Indian Tea Assoc., Sci. Dept. Quart. Jour. pt. 1: 31-41. 1926.
 Abstract in Expt. Sta. Rec. 55: 807. Dec., 1926.
 "Observations at Tocklai on temperature of the air and soil, sunshine,
 precipitation, and wind are reported and discussed in their relation to
 the tea crop."
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 METEOROLOGICAL OBSERVATIONS IN THE DOOARS, 1925. PLANT DISEASE AND THE
 WEATHER. Indian Tea Assoc., Sci. Dept. Quart. Jour., pt. 2: 61-72. 1926.
 "Vapour pressure or humidity is the controlling factor in deciding the
 tea crop. The indigenous tea bush is constructed to live in a hot humid
 climate and its leaves are designed so that they are able to transpire
 freely."
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 OBSERVATIONS ON THE CLIMATE AND CROP OF SEASONS 1918, 1919, AND 1920.
 Indian Tea Assoc., Sci. Dept. Quart. Jour., pt. 1: 28-31. 1921.
 Contains a brief discussion of the effect of temperature, rainfall, and
 humidity on the yield of tea in Assam in 1918, 1919, and 1920.
- HARRINGTON, GEORGE T. (826)
 FORCING THE GERMINATION OF FRESHLY HARVESTED WHEAT AND OTHER
 CEREALS. Jour. Agr. Research 23: 79-100. Jan. 13, 1923.
 The effect of temperature, water content, and oxygen pressure on the
 germination of freshly harvested cereals is considered.
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- (827)
 GERMINATING FRESHLY HARVESTED WINTER WHEAT. Science (n. s.) 50: 528.
 Dec. 5, 1919.
 "Of 16 samples of freshly harvested wheat an average of 99 per cent
 began to germinate in 5 days at temperatures from 9° to 16° C. (48°
 to 61° F.) . . . About 15° C. (59° F.) is recommended for use in making
 germination tests of all freshly harvested wheat."
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- (828)
 USE OF ALTERNATING TEMPERATURES IN THE GERMINATION OF SEEDS. Jour.
 Agr. Research 23: 295-332. Feb. 3, 1923.
 "The purpose of the present paper is not to discuss the possible
 explanation of the effects of temperature alternations upon germination
 but merely to show somewhat more in detail the nature and extent
 of such effects . . . The exact alternation giving best results depends
 upon the kind of seed and to some extent also upon its physiological
 content."
- HARRIS, JAMES A. (829)
 THE CORRELATION BETWEEN SUN-SPOT NUMBERS AND TREE GROWTH. U. S. Mo.
 Weather Rev. 54: 13-14. Jan., 1926.
 This study indicates a "low positive correlation between sun-spot
 numbers and tree growth. The relationship is by no means so intimate as
 many writers imply."
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 SUNSPOTS, CLIMATIC FACTORS AND PLANT ACTIVITIES. Amer. Nat. 51: 761-764.
 Dec., 1917.
 The purpose of this review is to call attention to certain recent dis-
 cussions on the relation between growth phenomena and sun-spot
 frequency.

- HARRIS, JAMES A., and POPENOE, WILSON. (S31)
FREEZING POINT LOWERING OF THE LEAF SAP OF THE HORTICUTURAL TYPES OF
PERSEA AMERICANA. Jour. Agr. Research 7: 261-268. Nov. 6, 1916.
A brief study of the problem of hardiness in the avocado.
- HARSHBERGER, JOHN W. (S32)
THE DIRECTIVE INFLUENCE OF LIGHT ON THE GROWTH OF FOREST PLANTS. Acad.
Nat. Sci. Phila., Proc. 60: 449-451. July, 1908.
"The growth of forest plants is largely a question of light relationship."
(S32a)
- OPEN WINTER AND PLANT LIFE. U. S. Mo. Weather Rev. 49: 20-21. Jan.,
1921. [Reprint from Philadelphia Public Ledger, Jan. 5, 1921.]
A brief, popular account of the destructive effect on many plants of an
open winter as contrasted with a normal one. (S33)
- THE RELATION OF ICE STORMS TO TREES. Penn. Univ., Bot. Lab. Contrib. 2:
345-349. 1904. (Pub. n. s., no. 5.)
Two severe ice storms in the neighborhood of Philadelphia gave occasion
to study the weight of ice that can be borne by different trees without
serious damage. (S34)
- SLOPE EXPOSURE AND THE DISTRIBUTION OF PLANTS IN EASTERN PENNSYLVANIA.
Geogr. Soc. Phila. Bul. 17 (2): 53-61. April, 1919.
- HARTLEY, CARL, and MERRILL, THEODORE C. (S35)
STORM AND DROUGHT INJURY TO FOLIAGE OF ORNAMENTAL TREES. Phytopa-
thology 5: 20-29. Feb., 1915.
"It is especially interesting to note the resemblance of leaves injured
by storm to those affected by drought, particularly on sugar maple."
and others. (S36)
- MOULDING OF SNOW-SMOTHERED NURSERY STOCK. Phytopathology 9: 521-531.
Nov., 1919.
"Evergreen plants partially smothered by tight packing or by pro-
longed mulch or snow cover during the winter are liable to injury from
weakly parasitic fungi attacking the leaves."
- HARTLEY, C. P., and ZOOK, L. L. (S37)
CORN GROWN UNDER DROUGHTY CONDITIONS. 24 p. Washington, D. C., 1916.
(U. S. Dept. Agr. Farmers' Bul. 773.)
"Corn makes its entire growth during the season of highest tempera-
ture . . . Growth is retarded during the summer months by cold nights
or cool weather . . . The heat requirement of corn prevents growth at
times when the moisture conditions are likely to be most favorable, while
lack of moisture frequently retards growth when the heat conditions are
most favorable."
- HARTMAN, HENRY. (S38)
THE RELATION OF HUMIDITY TO THE TEXTURE, WEIGHT, AND VOLUME OF FILBERTS.
22 p. Corvallis, Oreg., 1924. (Oreg. Agr. Expt. Sta. Bul. 202.)
- HARVEY, RODNEY B. (S39)
CAMBIAL TEMPERATURES OF TREES IN WINTER AND THEIR RELATION TO SUN
SCALD. Ecology 4: 261-265. July, 1923.
"The fluctuations which occur in the internal temperatures of trees
in winter are of importance on account of their relation to sun scald,
crotch injury, and related injuries to trees in northern climates." The
results of observations in Minnesota are given. (S40)
- CONDITIONS FOR HEAT CANKER AND SUNSCALD IN PLANTS. Minn. Hort.
51: 331-334. Nov., 1923. (S41)
- CONDITIONS FOR HEAT CANKER AND SUNSCALD IN PLANTS. Jour. Forestry
23: 392-394. Apr., 1925.
Studies made with flax and a number of fruits show that "heat
cankers or sunscald injuries are caused by the excessive heat generated
in exposed parts of plants by sunlight absorption. The injury is to be
expected on days when there are no clouds or breezes, when the soil is
dry, and when the average temperature is high."

HARVEY, RODNEY B.—Continued.

(842)

HARDENING PROCESS IN PLANTS AND DEVELOPMENTS FROM FROST INJURY. Jour. Agr. Research 15: 83-111. Oct. 14, 1918.

The author describes experiments showing the physiological changes on cabbages and tomatoes produced by low temperatures.

(843)

LENGTH OF EXPOSURE TO LOW TEMPERATURE AS A FACTOR IN THE HARDENING PROCESS IN TREE SEEDLINGS. Jour. Forestry 28: 50-53. Jan., 1930.

(844)

TIME AND TEMPERATURE FACTORS IN HARDENING PLANTS. Amer. Jour. Bot. 17: 212-217. Mar., 1930.

"The hardness of cabbages was determined after exposure to various continuous hardening treatments and after alternation between high and low temperatures . . . It is suggested that hardness in plants is a cold shock response."

(845)

VARIETAL DIFFERENCES IN HARDINESS. Market Growers Jour. 30: 206, 208. Apr. 1, 1922.

Winter hardness in truck crops is briefly discussed.

(846)

VARIETAL DIFFERENCES IN THE RESISTANCE OF CABBAGE AND LETTUCE TO LOW TEMPERATURES. Ecology 3: 134-139. April, 1922.

"An exact method for testing the ability of plants to harden is given and applications for it are suggested. Using this method, the relative injury to varieties of cabbage and lettuce at low temperatures is shown to be dependent upon varietal differences in the ability of these plants to harden."

— and TRUE, R. H.

(847)

THE INFLUENCE OF LIGHT AND CHLOROPHYLL FORMATION ON THE MINIMUM TOXIC CONCENTRATION OF MAGNESIUM NITRATE FOR THE SQUASH. Amer. Jour. Bot. 4: 407-410. July, 1917.

— and WRIGHT, R. C.

(848)

FROST INJURY TO TOMATOES. 9 p. Washington, D. C., 1922. (U. S. Dept. Agr. Bul. 1099.)

"The tomato plant . . . shows but little adaptation to low temperature and can not be frozen without killing."

HASELBERG, HEINRICH.

(849)

THE EFFECT OF SHADING ON THE TRANSPIRATION AND ASSIMILATION OF THE TOBACCO PLANT IN CUBA. Bot. Gaz. 57: 257-286. April, 1914.

"Under the climatic conditions of Western Cuba the transpiration of tobacco plants grown in the open ground is nearly 30 per cent greater than the transpiration of plants grown under the cheesecloth shade commonly used for shading tobacco in that region. The transpiration per unit area of leaf surface is nearly twice as great in the sun plants as in the shade plants."

HAURI, H.

(850)

WINTERRUHE UND LEBENSRYTHMUS UNSERER PFLANZEN. Natur. u. Technik. Schweiz. Ztschr. Naturw. 5: 253-257. Jan. 15, 1924.

Winter rest and plant rhythm are briefly discussed.

HAWKINS, LON A.

(851)

INVESTIGATIONS ON THE FREEZING OF CITRUS FRUIT ON TREES. Calif. Citrog. 9: 163. Mar., 1924.

(852)

ORANGE FREEZING A HAZARD IN ALL UNITED STATES GROVES. U. S. Dept. Agr. Yearbook 1926: 559-560. 1927.

Evidences of freezing injury are noted.

— and SANDO, CHARLES E.

(852a)

EFFECT OF TEMPERATURE ON THE RESISTANCE TO WOUNDING OF CERTAIN SMALL FRUITS AND CHERRIES. U. S. Dept. Agr. Bul. 830, 6 p. 1920.

HAWKINS, R. S., and SERVISS, GEORGE H.

(853)

DEVELOPMENT OF COTTON FIBERS IN THE PIMA AND ACALA VARIETIES. Jour. Agr. Research 40: 1017-1029. June 1, 1930.

"The time of the season during which cotton fibers are developing affects the rate of fiber-wall thickening greatly but does not influence

- HAWKINS, R. S., and SERVISS, GEORGE H.—Continued.
the rate of fiber growth in length to any appreciable extent until late in the season. Prevailing temperatures contribute to the rate of fiber development, and, when lower than necessary for optimum plant growth, have a retarding effect on both fiber elongation and fiber-wall thickening."
- HAYES, HERBERT K., and AAMODT, O. S. (854)
INHERITANCE OF WINTER HARDINESS AND GROWTH HABIT IN CROSSES OF MARQUIS WITH MINHARDI AND MINTURKI WHEATS. Jour. Agr. Research 35: 223-236. Aug. 1, 1927.
- HAYLETT, D. G. (855)
A PRELIMINARY STUDY OF CROP YIELDS AND RAINFALL IN THE TRANSVAAL. 61 p. Pretoria, 1930. (Transvaal Univ. Col. T. U. C. Bul. 19.)
This bulletin deals with the effect of rainfall on the yield of maize in the Transvaal. It "is preliminary to further studies, in progress and projected, on the relationship between moisture and crop production."
- HEALD, FREDERICK D. (856)
HOW TREES ARE HURT BY WINTER INJURY. Better Fruit. 20 (7): 5-6, 16. Jan., 1926; (8): 18, 29-31. Feb., 1926.
— and GEORGE, D. C. (856a)
THE WIND DISSEMINATION OF THE SPORES OF BUNT OR STINKING SMUT OF WHEAT. Wash. Agr. Expt. Sta. Bul. 151, 23 p. Pullman. 1918.
— GARDENER, M. W., and STUDHALTER, R. A. (856b)
AIR AND WIND DISSEMINATION OF ASCOSPORES OF THE CHESTNUT-BLIGHT FUNGUS. Jour. Agr. Research 3: 493-526. 1915.
Experiments are described which "point to air and wind transport of the ascospores of the chestnut-blight fungus as one of the very important methods of dissemination . . . It can now be said with absolute certainty that following each warm rain of any amount ascospores are carried away from diseased trees in large numbers . . . During dry periods wind dissemination of ascospores does not occur at all or sinks to a very insignificant minimum."
- HEARN, GEORGE D. (857)
RELATION OF SUNLIGHT TO PLANT DEVELOPMENT. U. S. Mo. Weather Rev. 50: 423-425. Aug., 1922.
This is a report on experiments which show the importance of the length of day as a factor in crop yields.
- HECKER, A. (858)
DIE JAHRESWITTERUNG IN IHREM EINFLUSSE AUF DIE BESCHAFFENHEIT DER GERSTEN, KARTOFFELN UND ZUCKERRÜBEN. Landw. Jahrb. 41: 417-526. 1911.
Abstract in Expt. Sta. Rec. 26: 415. Apr., 1912.
"Data for sums of temperature, sunshine, and rainfall from April to October, 1883 to 1907, for 11 stations in beet and barley growing regions are given and correlated with the yield and quality of barley, potatoes, and sugar beets."
- HEDRICK, ULYSSES P. (859)
FACTORS AFFECTING HARDINESS IN FRUITS. 10 p. Boston, 1919. (Mass. State Dept. Agr. Circ. 6.)
Symposium of experiences on varying behavior of peach trees during freezes and frosts. (860)
THE RELATION OF WEATHER TO THE SETTING OF FRUIT; WITH BLOOMING DATA FOR 866 VARIETIES OF FRUIT. p. 59-138. Geneva, 1908. (N. Y. State Agr. Expt. Sta. Bul. 299.)
"In New York, unfavorable weather is probably the predominating one of the several factors which cause the loss of fruit crops during the blooming time." (861)
WINTER INJURY OF FRUIT TREES. Amer. Fruit Grower Mag. 45 (4) 3, 39. Apr., 1925.
- HEIDEMA, J. (862)
BESCHADIGING VAN VLAS DOOR HITTE EN NACHTVORST. Tijdschr. Plantenziekten 29 (af. 9): 145-148. Sept., 1923.
Damage to flax by heat and night frost is briefly discussed.

- HEINE, CARL. (863)
DIE EINWIRKUNG DES FROSTES WINTER 1928-1929 AUF UNTERLAGE UND SORTEN
DER SÜSSKIRSCHENBÄUME IM MITTELDEUTSCHEN KIRSCHENANBAUGEBIET.
Obst. u. Gemüsebau 75: 188-191. Oct. 16, 1929.
A brief account of the effect of frost in 1928-29 on sweet cherry trees in
central Germany.
- HEINISCH, OTTOKAR. (864)
BEITRAG ZUR METHODIK DER UNTERSUCHUNG VON WINTERGETREIDE AUF KÄLTE-
RESISTENZ. Ztschr. Pflanzenzücht, 14 (1): 1-34. Dec., 1928.
Cold resistance in winter wheat is studied.
- HEINRICHER, E. (865)
DIE SAMENKEIMUNG UND DAS LICHT. Ber. Deut. Bot. Gesell. 26a: 298-301.
May 27, 1908.
The author discusses Kinzel's criticism of an article on the accelerating
influence of light on seed germination published in v. 17, 1899, of these
reports.
- HEITSHU, D. C. (866)
STUDIES OF MOISTURE CONTENT AND DRYING OF COMBINED GRAIN IN VIRGINIA.
Agr. Engin. 10 (2): 63-64. Feb., 1929.
"The most outstanding result of this study is the close relation found
between the moisture content of wheat and the relative humidity. While
there was not sufficient rainfall to judge accurately, it would seem that
rainfall does not affect the moisture content of standing wheat except
as the rainfall causes a change in the relative humidity."
- HEMENWAY, ANSEL F. (867)
LATE FROST INJURY TO SOME TREES IN CENTRAL KENTUCKY. Amer. Jour. Bot.
13: 364-366. June, 1926.
- HEMMI, TAKEWO. (868)
EFFECT OF TEMPERATURE ON SOME FUNGI CAUSING ANTHRACNOSE OF PLANTS.
Jour. Soc. Agr. and Forestry. Sapporo, Japan, 10: 239-282, 339-417.
Dec., 1918.
In Japanese.
- _____ (869)
ON THE RELATION OF TEMPERATURE TO THE DAMPING OFF OF GARDEN CRESS
SEEDLINGS BY PYTHIUM DEBARYANUM AND CORTICIUM VAGUM. Phytopathol-
ogy 13: 273-282. June, 1923.
- HENDRY, G. W. (870)
CLIMATIC ADAPTATIONS OF THE WHITE TEPARY BEAN. Jour. Amer. Soc. Agron.
11: 247-252. Sept., 1919.
"The pre-blossoming period, the blossoming period, and the life period
are each functions of climate. They are longer in cool climates than in
warm climates, and they are either increased or diminished as the plant-
ing date causes them to occur during cool or warm weather."
- HENNER, GEORG. (871)
MASSNAHMEN DES FROSTSCHUTZES IM PFLANZENBAU. Pflanzenbau Halbmo-
natsschr. Saatwesen, Anbau u. Pflege der Kulturpflanzen 2 (8): 128-129.
Oct. 15, 1925.
Frost protection measures.
- HENNING, ERNST. (872)
BIDRAG TILL KÄNNEDOMEN OM DEN S. K. GULSPETSSJUKAN HOS SÄDESSLAGEN.
Meddel. Centralanst. Eörsöksv. Jordbruksområdet [Sweden] 179, Bot.
Avdelningen 15, 30 p. 1918.
Discusses the effect of frost and drought on yellow spot disease of
grain.
- HENRICI, MARGUERITE. (873)
GROWTH OF VELD PLANTS UNDER ARID CONDITIONS OF BECHUANALAND. So.
African Jour. Sci. 23: 325-339. Dec., 1926.
The influence of light, temperature, and moisture on veld plants is
considered.
- _____ (874)
PHYSIOLOGICAL PLANT STUDIES IN SOUTH AFRICA. So. Africa Dept. Agr.,
Director Vet. Ed. and Research Rpts. 11-12 (pt. 1): 617-702. Sept., 1926.
I. Wilting and osmotic phenomena of grasses and other plants under
arid conditions. II. Transpiration of grasses and other plants under arid
conditions.

- HENRICI, MARGUERITE—Continued. (875)
THE RELATIONS BETWEEN THE AMOUNT OF CARBOHYDRATES IN THE LEAVES OF ARMOEDSVLAKE GRASSES AND THE METEOROLOGICAL FACTORS. So. Africa Dept. Agr., Director Vet. Ed. and Research Rpts. 13-14 (pt. 2): 1041-1074. Oct., 1928.
- HENRY, A. J. (876)
DOUGLASS ON CLIMATIC CYCLES AND TREE-GROWTH. U. S. Mo. Weather Rev. 50: 125-127. March, 1922.
"The investigation described in this monograph is a continuation and a more complete presentation of the subject dealt with in an article in Monthly Weather Review for June, 1909."
— and others. (877)
WEATHER AND AGRICULTURE. U. S. Dept. Agr. Yearbook 1924: 457-558. 1925.
A distinction is made between weather and climate, and among the subjects discussed are weather and crop yields, weather and corn, weather and wheat, weather and oats, weather and minor grain crops, weather and cotton, weather and livestock, and weather and forests.
- HENSLEY. (878)
ÜBER DIE FOLGEN DES HAGELSCHLAGS VOM 10. AUGUST 1905 IM PFÄLZER WEINGEBIET UND DIE VON DEN WINZERN BEHUFES DAUERNDER SCHADEN-MINDERUNG DURCHGEFÜHRTE MASSNAHMEN. Prakt. Bl. Pflanzenbau u. Schutz 9 (Hft. 7): 74-78. July, 1906.
The effect of a hailstorm on vines and protective measures taken by vineyardists are discussed.
- HENSLAW, GEORGE. (879)
INJURIES TO PLANTS BY LONDON FOG AND BY ENGINE SMOKE. Jour. Roy. Hort. Soc. 26 (pt. 2-3): 310-313. Dec., 1901.
"In both cases the general effect, allowing for various degrees of injury, is the same, and these are of 2 classes, viz: First, injury resulting from the arrest of light; and secondly, from the poisonous nature of the ingredients of smoke."
— (880)
ON THE ABSORPTION OF RAIN AND DEW BY THE GREEN PARTS OF PLANTS. Jour. Roy. Hort. Soc. 34 (pt. 2): 167-178. 1908.
- (881)
ON THE EFFECTS OF EXCESSIVE DROUGHT UPON PLANTS; OR THE ORIGIN OF XEROPHYTES. Jour. Roy. Hort. Soc. 37 (pt. 3): 505-507. 1912.
- HEPPNER, MYER J. (882)
FROST AND THE FRUIT GROWER. Amer. Fruit Grower Mag. 44 (1): 5, 42. Jan., 1924.
- HEPTIA, R. (883)
DES INFLUENCES CLIMATÉRIQUES SUR LA VÉGÉTATION BETTERAVERIÈRE EN HESBAYE PENDANT L'ANNÉE 1926. Ann. de. Gembloux 33: 296-297. Aug., 1927.
The influence of temperature, rainfall, and insolation on the growth of the sugar beet in Hesbaye during 1926.
- HERBERT, D. A. (884)
THE SUN AND PLANT DISTRIBUTION. Queensland Nat. 6 (4): 58-66. Apr., 1928.
The effect of sunlight on a number of different plants is discussed.
- HERBERT, PAUL A. (885)
THE WEATHER AND MAPLE SUGAR PRODUCTION. p. 60-62. East Lansing, 1924. (Mich. Agr. Expt. Sta. Quart. Bul. v. 7, no. 2.
A study of weather conditions which might influence sugar production, covering the years 1915 to 1924, shows that rainfall is the most important single factor in the amount of maple sugar produced, and that, "other climatic factors being normal, there is always sufficient heat and sunlight present during the growing season to produce the maximum amount of sugar obtainable."
- HERCÍK, FERDINAND. (886)
ÜBER DIE URSACHEN DER PHOTOKAPILLAREN REAKTION DER PFLANZEN. Planta Arch. Wiss. Bot. 8: 364-368. Aug. 9, 1929.
A study of capillary reaction of plants to light.

- HERRICK, R. S. (887)
WINTER AND FROST INJURIES OF FRUIT TREES. p. 12-19. Fort Collins, 1910.
(Colo. Agr. Expt. Sta. Bul. 170.)
"The object . . . is to define as nearly as possible the different effects of freezing temperatures upon fruit trees and also to show that these effects often cause the death of fruit trees in Colorado." Injury to peach and apple trees only is discussed.
- HERRMANN, CHARLES F. VON. (888)
PROTECTION AGAINST FROST IN GEORGIA. U. S. Mo. Weather Rev. 42: 585-586. Oct., 1914.
The author deplors the lack of interest in frost warnings in Georgia.
- HERSCHEL, SIR WILLIAM. (889)
OBSERVATIONS TENDING TO INVESTIGATE THE NATURE OF THE SUN, IN ORDER TO FIND THE CAUSES OR SYMPTOMS OF ITS VARIABLE EMISSION OF LIGHT AND HEAT; WITH REMARKS ON THE USE THAT MAY POSSIBLY BE DRAWN FROM SOLAR OBSERVATIONS Roy. Soc. [London] Phil. Trans. 91: 265-318. 1801.
The author argues that the variation in the number of sunspots is probably accompanied by a variation in the amount of heat received upon the earth which in turn influences vegetation. He attempts to establish a relation between changes in the number of sunspots and changes in the price of wheat.
- HERTRICH, W. (890)
SUSCEPTIBILITY OF AVOCADOS TO FROST INJURY. Calif. Cult. 58: 570. May 27, 1922.
- HESSLING, N. A. (891)
RELATION BETWEEN THE RAINFALL, THE TEMPERATURE, AND THE YIELD OF CORN IN ARGENTINA. U. S. Mo. Weather Rev. 49: 543-548. Oct., 1921.
The author finds that the two most important factors in the yield of corn in the Argentine Republic are the rainfall and the temperature in the months of October to January.
- RELATIONS BETWEEN THE WEATHER AND THE YIELD OF WHEAT IN THE ARGENTINE REPUBLIC. U. S. Mo. Weather Rev. 50: 302-308. June, 1922.
The author discusses the effect of rainfall and of temperature variations on the yield of wheat in the Argentine Republic.
- HEUVEL, A. TEN. (893)
WEERSINVLOEDEN BIJ ZOMERBEMESTING VAN GRASLAND. Landbouwk. Tijdschr. 36: 146-148. Apr., 1924.
The influence of weather during summer manuring on grassland is noted.
- HIBBARD, R. P. (894)
FROST PROTECTORS FOR EARLY PLANTING. p. 150-153. East Lansing, 1925. (Mich. Agr. Expt. Sta. Quart. Bul. v. 7.)
- HICKMON, W. C. (895)
WEATHER AND CROPS IN ARKANSAS, 1819 TO 1879. U. S. Mo. Weather Rev. 48: 447-451. Aug., 1920.
An outline of the general effect of weather conditions on crops in Arkansas between 1819 and 1879.
- HIGGINS, BASCOMB B. (896)
WINTER INJURY TO PECANS. Amer. Fruit Grower Mag. 44 (1): 13. Jan., 1924.
- HILDEBRANDT, F. MERRILL. (897)
A PHYSIOLOGICAL STUDY OF THE CLIMATIC CONDITIONS OF MARYLAND, AS MEASURED BY PLANT GROWTH. Physiol. Researches 2 (ser. 18): 341-405. May, 1921.
"The present paper presents the results obtained from a study of a series of observations on the climatic complexes for nine different stations in Maryland for the summer of 1914, as the effectiveness of each complex was automatically integrated by soybean plants grown for a period of 4 weeks from the seed, new seeds being planted every 2 weeks. Corresponding instrumental observations were also studied."
- HILDRETH, AUBREY C. (898)
DETERMINATION OF HARDINESS IN APPLE VARIETIES AND THE RELATION OF SOME FACTORS TO COLD RESISTANCE. 37 p. University Farm, St. Paul, 1926. (Minn. Agr. Expt. Sta. Tech. Bul. 42.)

HILDRETH, AUBREY C.—Continued.

It is shown that "degree of cold injury is directly proportional to the duration of exposure to a given low temperature . . . A rapid fall in temperature above the killing point is more injurious than gradual lowering."

HILEY, W. E., and CUNLIFFE, NORMAN.

(899)

AN INVESTIGATION INTO THE RELATION BETWEEN HEIGHT GROWTH OF TREES AND METEOROLOGICAL CONDITIONS. 19 p. Oxford, Oxford University, School of Forestry, 1922. (Oxford Forestry Mem. 1.)

Abstract in Internatl. Rev. Sci. and Pract. Agr. [Rome] 13:1526-1528. Dec., 1922.

The factors considered are temperature, rainfall, sunshine, and wind, and the trees investigated are Sitka spruce, Corsican pine, and European larch.

HILL, DONALD D., and SALMON, S. C.

(900)

THE RESISTANCE OF CERTAIN VARIETIES OF WINTER WHEAT TO ARTIFICIALLY PRODUCED LOW TEMPERATURES. Jour. Agr. Research 35: 933-937. Nov. 15, 1927.

This paper describes an attempt "made at the Kansas Agricultural Experiment Station to determine the feasibility of artificially freezing plants as a means of determining their relative hardness . . . The results are in close agreement with what is known of the relative survival of these varieties as determined in the uniform winter-hardness nurseries."

HILL, LEONARD.

(901)

THE GROWTH OF SEEDLINGS IN WIND. Roy. Soc. [London.] Proc., Ser. B 92 (B642): 23-31. Jan. 3, 1921.

"The conclusion is reached that the stunting effect produced by wind is not only due to a less favourable wetting, but to greater cooling. The growing point may be robbed by wind of heat which is produced in the cellular growth processes—heat which facilitates growth."

HILTNER, E.

(902)

DIE PHÄNOLOGIE UND IHRE BEDEUTUNG UNTER BESONDERER BERÜCKSICHTIGUNG DER PHÄNOL. BEOBSACHTUNGEN AM WINTERROGGEN IN BAYERN WÄHREND DER JAHRE 1917-1923. 86 p. Freising-München, F. P. Datterer & cie., 1926. (Naturw. u. Landw. Hft. 8.)

Abstract in Expt. Sta. Rec. 55: 716. Dec., 1926.

The author "discusses the history, development, and applications of phenological study, and reports in detail the results of observations on the influence of variety, fertilizers, soil, climate, altitude, disease, and other factors on winter rye in Bavaria."

HILTNER, LORENZ.

(903)

ÜBER DIE DIESJÄHRIGEN AUSWINTERUNGSSCHÄDEN BEI KLEE UND ROGGEN. Prakt. Bl. Pflanzenbau u. Schutz 16 (4): 54-56. Apr., 1913.

Winter injury to clover and rye.

— AND GENTNER.

(904)

NACHTRAG ZU DEM AUFSATZ "ÜBER DIE DIESJÄHRIGEN AUSWINTERUNGSSCHÄDEN BEI KLEE." Prakt. Bl. Pflanzenbau u. Schutz 16 (Hft. 7): 91-84. July, 1913.

A supplement to a previous paper by L. Hiltner on winter injury to clover and rye.

HITTER, H.

(905)

LA RÉSISTANCE DES BLÉS À L'HIVER. Jour. Agr. Prat. (n. s.) 28 (29): 82-84. July 16, 1914.

The resistance to cold of various varieties of wheat is studied.

HIURA, MAKOTO.

(906)

STUDIES ON SOME DOWNY MILDEWS OF AGRICULTURAL PLANTS. II. RELATION OF METEOROLOGICAL CONDITIONS TO THE DOWNY MILDEW OF CUCUMBER. Gifu Imp. Col. Agr. Research. no. 6, Mar., 1929. [n. p.]

In Japanese with summary in English.

"The first appearance of the disease is strikingly influenced by both rainfall and temperature . . . Temperature plays an important role in the whole course of the disease . . . The prevalence and decline of the disease may be chiefly due to the influence of temperature on the causal fungus."

- HOAGLAND, DENNIS R., and DAVIS, A. R. (907)
 FURTHER EXPERIMENTS ON THE ABSORPTION OF IONS BY PLANTS, INCLUDING
 OBSERVATIONS ON THE EFFECT OF LIGHT. Jour. Gen. Physiol. 6 (1) : 47-62.
 Sept. 20, 1923.
- HOARE, A. V. (908)
 THE ENGLISH GRASS ORCHARD. 227 p. London, E. Benn (Ltd.), 1928.
 "It is hardly possible to grow fruit successfully for market in a
 district receiving anything in excess of 40 inches of rainfall. At between
 30 and 40 inches fruit may be grown, but the orchards are mostly on
 the grass-orchard principle, as we find on the British side of Gloucester
 and in Somerset. In the regions of 25 to 30 inches fruit may be grown
 in either cultivated or grassed land. Below 25 inches fruit will do well
 on holding land. It might be laid down, therefore, that the best fruit
 districts are those with an average rainfall not higher than 30 inches."
 (p. 27).
- HODGSON, FRANK R. (909)
 OBSERVATIONS ON THE REST PERIOD OF DECIDUOUS FRUIT TREES IN A MILD
 CLIMATE. Amer. Soc. Hort. Sci. Proc. 1923 : 151-155.
- HODGSON, ROBERT W. (910)
 THE CALIFORNIA AVOCADO INDUSTRY. 86 p. Berkeley, April, 1930. (Calif.
 Agr. Col. Ext. Circ. 43.)
 "The principal climatic factors limiting the culture of the avocado in
 California, in the order of their importance, appear to be low winter
 temperatures, high spring and summer temperatures, and low atmospheric
 humidity during the blooming and setting period in the spring."
 (p. 27).
- SOME ABNORMAL WATER RELATIONS IN CITRUS TREES OF THE ARID SOUTHWEST
 AND THEIR POSSIBLE SIGNIFICANCE. Calif. Univ. Pub., Agr. Sci. 3 (3) :
 37-54. Sept. 29, 1917.
 The author describes experiments which provide evidence that "marked
 changes in air temperature and humidity may be sufficient to cause
 abscission of young fruits [of citrus trees] even though the soil moisture
 conditions be ideal."
- HÖFKER, HINRICH. (912)
 ÜBER DEN EINFLUSS DER WINTERWITTERUNG AUF DIE GEHÖLZE MIT BESONDERER
 BERÜCKSICHTIGUNG DES STRENGEN FROSTES IM WINTER 1916/17. Mitt. Deut.
 Dendrol. Gesell. 28 : 196-207. 1919.
 An account of the effect of severe frost on trees in 1916-17.
- HOFFMAN, I. C. (913)
 THE POSSIBLE RELATION OF ANTHOCYAN PIGMENTS TO SUMMER INJURY IN
 POTATOES AND SWEET CORN. Amer. Soc. Hort. Sci. Proc. 1923 : 188-191.
- HOFFMANN, M. (914)
 BEZIEHUNGEN DER WITTERUNG ZU DEN RÜBENERNTEN. EIN BEITRAG ZUR METEOROLOGIE
 DES ZUCKERRÜBENBAUS. Bl. Zuckerrübenbau 15 (2) : 17-28. Jan.
 31, 1908.
 The influence of rain and sunshine on the yield of the sugar beet is
 studied.
- HOLBERT, JAMES R., and BURLISON, W. L. (915)
 STUDIES OF COLD RESISTANCE AND SUSCEPTIBILITY IN CORN. (Abstract)
 Phytopathology 19 : 105-106. Jan., 1929.
 Abstract of a paper presented at the twentieth annual meeting of the
 American Phytopathological Society, New York, N. Y., December 28,
 1928-Jan. 1, 1929.
- HOLDEFLEISS, PAUL. (916)
 DIE ABHÄNGIGKEIT DER ERNTERTRÄGE VON WITTERUNGSFAKTOREN. Wetter
 21 : 205-211, 237-240. 1904.
 The author discusses the effect of low temperature on the yield
 of grain.
- AGRARMETEOROLOGIE; DIE ABHÄNGIGKEITEN DER ERNTERTRÄGE VON WETTER
 UND KLIMA. 107 p. Berlin, P. Parey, 1930.
 A general discussion of the effect of weather conditions on plant yield.
- ÜBER DEN EINFLUSS DER WITTERUNGSFAKTOREN AUF DIE ERNTERTRÄGE. Kühn
 Arch. 9 : 53-78. 1925.
 The effect of rainfall and temperature on peas, potatoes, wheat, oats,
 and rye is discussed.

- HOLDEFLEISS, PAUL—Continued. (919)
 WITTERUNGSKUNDE FÜR LANDWIRTE. 84 p. Stuttgart, Eugen Ulmer, 1907.
 The importance of meteorology in agriculture and of weather predictions for the farmer is discussed.
- HOLLINGER, ALMA. (920)
 DOES THE MOVEMENT OF AIR EFFECT THE GROWTH OF PLANTS? Mich. Acad. Sci. Rpt. 17: 159-160. 1915.
 This is a preliminary report on a series of experiments carried on in a dark room, the results of which show that "moving air does affect the growth of plants."
- HOLLSWELL, E. A. (921)
 INFLUENCE OF ATMOSPHERIC AND SOIL MOISTURE UPON SEED SETTING IN RED CLOVER. Jour. Agr. Research 39: 229-247. Aug. 15, 1929.
 "Although these investigations indicate that variations in moisture conditions surrounding the plant at the time of reproduction do not limit seed setting, it is believed that moisture indirectly affects red-clover seed production in that it appears to influence the activities of pollinating insects."
- HOLMES, J. S. (921a)
 DAMAGE TO FORESTS BY HAIL IN NORTH CAROLINA. U. S. Mo. Weather Rev. 49: 333. 1921.
- HOLTERMANN, CARL. (922)
 DER EINFLUSS DES KLIMAS AUF DEN BAU DER PFLANZENGEWEBE. 249 p. Leipzig, W. Engelmann, 1907.
 Abstract in Expt. Sta. Rec. 18: 922. June, 1907.
 "The results are given of extensive anatomical and physiological studies made in the Tropics to determine the effect of tropical climatic conditions on the structure of plant tissues . . . Considerable attention is given to the transpiration of tropical plants, especially as influenced by the temperature and moisture relations."
- HOMER, PHILENA F. (923)
 VARIABILITY OF FROST INJURY ON FRUIT BUDS. U. S. Mo. Weather Rev. 39: 599-600. Apr., 1911.
 The author discusses the types of injury inflicted by frost on fruit buds and their power of resistance.
- HONING, J. A. (924)
 DE INVLOED VAN HET LICHT OP HET KIEMEN VAN DE ZADEN VAN VERSCHILLENDE VARIËTEITEN VAN NICOTIANA TABACUM. [THE INFLUENCE OF LIGHT ON THE GERMINATION OF THE SEEDS OF DIFFERENT VARIETIES OF NICOTIANE TABACUM.] Deli-proefsta. Medan. Bul. 7: 1-14. 1916.
 It is found that certain kinds of tobacco seed germinate in darkness almost as well as in light, although more slowly, while in the case of other kinds, only a very small percentage will germinate in darkness.
- HOOKE, HENRY D., jr. (925)
 PENTOSAN CONTENT IN RELATION TO WINTER HARDINESS. A NEW THEORY OF HARDINESS AND SUGGESTIONS FOR ITS APPLICATION TO POMOLOGICAL PROBLEMS. Amer. Soc. Hort. Sci. Proc., 1920: 204-207.
- HOOKE, REGINALD H. (926)
 CORRELATION OF THE WEATHER AND CROPS. Jour. Roy. Statis. Soc. 70 (pt. 1): 1-42. March, 1907.
 The author shows to what extent in the east of England the yield of wheat, barley, oats, beans, peas, potatoes, turnips, and swedes, man-golds, and hay are dependent upon temperature and rainfall. He points out that the yield is influenced not merely by the character of the weather during the later stages of growth, but also during seed time.
- FORECASTING THE CROPS FROM THE WEATHER. Quart. Jour. Roy. Met. Soc. [London] 47: 75-99. Apr., 1921. (927)
 In his address as president of the Royal Meteorological Society, delivered on Jan. 19, 1921, the author gives a brief account of the studies that have already been made with regard to the effect of weather upon the yield of crops, and discusses the problem of the use of the knowledge acquired as a guide to the probable size of the resultant harvest.
- THE WEATHER AND THE CROPS IN EASTERN ENGLAND. Quart. Jour. Roy. Met. Soc. [London] 48: 115-138. Apr., 1922. (928)

HOOKER, REGINALD H.—Continued.

The author has reworked for the years 1885-1919 the material used in his paper published in the Jour. Roy. Statis. Soc. 70:1-42. 1907. He has "correlated the ascertained yield of the crop with the rainfall and temperature of overlapping periods of eight weeks from the spring of the previous year until after harvest."

HOPKINS, EDWIN F. (929)

RELATION OF LOW TEMPERATURES TO RESPIRATION AND CARBOHYDRATE CHANGES IN POTATO TUBERS. Bot. Gaz. 78: 311-325. Nov., 1924.

HORNBY, A. J. W. (930)

TOBACCO CULTURE. A COMPARISON OF METHODS ADOPTED IN THE UNITED STATES AND IN NYASALAND. Nyasaland Protectorate Dept. Agr., Agron. Ser. Bul. 1, 87 p. June, 1926.

"The lower elevations with a small average rainfall give the best results in tobacco culture . . . The climate of the tobacco districts varies from warm temperate to tropical, the temperatures being considerably lowered by the summer rains"

HOTES, CHARLES F., and WILSON, H. K. (931)

RESISTANCE OF WHEAT TO HIGH TEMPERATURES UNDER DIFFERENT METHODS OF HEATING. Jour. Amer. Soc. Agron. 22: 108-112. Feb., 1930.

"Resistance to high temperatures is inversely proportional to the water content of the seed."

HOUEARD, C, and LORTET, M. (932)

DES EFFETS DE L'HIVER 1916-17 SUR LES PLANTES DU JARDIN BOTANIQUE DE CAEN. Soc. Linn. Normandie Bul. (6) 10: 184-212. 1917.

An account of the effect of the winter of 1916-17 on the plants of the Botanic Garden of Caen.

HOW RAINFALL AFFECTS APPLE YIELD. Canad. Hort. 51 (3): 90, 92. Mar., 1928. (933)

"Of the 50 trees studied, 33 showed a definite relationship between rainfall and yield."

HOWARD, ALBERT. (934)

CROP-PRODUCTION IN INDIA. A CRITICAL SURVEY OF ITS PROBLEMS. 200 p. [London] Oxford University press, 1924.

Contains references to the effect on crops of weather conditions and of soil moisture and temperature.

(935)

THE INFLUENCE OF THE WEATHER ON THE YIELD OF WHEAT. Agr. Jour. India. 11: 351-359. Oct., 1916.

The author discusses the effect of rainfall and soil temperature on the growth of wheat. He finds that the distribution of the rainfall is more important than the total amount.

HOWLETT, FREEMAN S. (936)

FROST INJURY TO THE APPLE. Ohio Agr. Expt. Sta. Bi-Mo. Bul. 11, no. 3: p. 104-109. May-June, 1926.

HOXMARK, GUILLERMO. (937)

LAS CONDICIONES CLIMATOLÓGICAS Y EL RENDIMIENTO DEL TRIGO. Argentine Republic Min. Agr. Sección de Propaganda e Informes Circ. 501: 43 p. Aug. 24, 1925.

A study of the influence of rainfall and temperature on the yield of wheat based on observations covering the years 1912-1923. The conclusion is drawn that the probable yield of wheat can be calculated with an appreciable degree of accuracy from the meteorological conditions of the preceding winter, from April to August.

(937a)

THE INFLUENCE OF THE CLIMATIC CONDITIONS ON THE YIELD OF WOOL IN ARGENTINA. Transl. and abstracted by G. B. Diehl. U. S. Mo. Weather Rev. 56: 60-61. Feb., 1928.

"The temperature and precipitation in March both exercise a greater influence than the other months of the year, low temperatures giving high yields and much precipitation being favorable."

(938)

EL MAÍZ EN LA ARGENTINA. LOS RENDIMIENTOS Y LAS CONDICIONES CLIMATOLÓGICAS. Argentine Republic Min. Agr. Sección de Propaganda e Inform. no. 697, 44 p. June, 1927.

Tables showing the coefficients of correlation between rainfall and temperature and yield of corn are given for the period 1912-1925.

- HUBER, BRUNO. (1939)
WEITERE BEOBSACHTUNGEN ÜBER VERSCHIEDENE DÜRRERESISTENZ BEI LICHT- UND SCHATTENPFLANZEN. Ber. Deut. Bot. Gesell. 43: 551-559. Jan. 28, 1926.
Some observations on the difference in drought resistance between plants grown in light and in shade.
- HÜBBENET, E. (1940)
THE INFLUENCE OF THE TEMPERATURE UPON THE ENERGY OF THE ACCUMULATION OF CHLOROPHYLL IN ETIOLATED PLANTULES. Bul. Inst. Sci. Lesshaft Leningrad, t. 11, no. 1, p. 39-56. 1925.
- HUELSEN, W. A. (1941)
THE EFFECT OF CERTAIN EXTERNAL FACTORS ON THE VIGOR OF SWEET CORN. Amer. Soc. Hort. Sci. Proc. 1926: 221-231.
"The data show that the three factors of temperature, length of exposure to heat, and initial moisture content, have the same progressive injurious effect on sweet corn and further that they are closely related to each other."
- HUGUES, M. (1942)
ÉTUDE COMPARATIVE DE RAISINS PROVENANT DE VIGNES GELÉES ET NON GELÉES. Ann. Falsif. 4: 175-176. Apr., 1911.
Tables are given showing the effect of frost on grapes and on wine.
- HUME, H. HAROLD. (1943)
THE CULTIVATION OF CITRUS FRUITS. 561 p. New York, The Macmillan Co. 1926.
Contains a chapter on frost and frost protection.
- HUMPHREY, CLARENCE J. (1944)
WINTER INJURY TO THE WHITE ELM. Phytopathology 3: 62-63. Feb., 1913.
- HUMPHREYS, W. J. (1945)
FROST PROTECTION. U. S. Mo. Weather Rev. 42: 562-569. Oct., 1914.
"The most important thing in relation to frost protection is the proper adaptation to each other, at the time of planting, of fruit, climate, and location, with reference especially to time of flowering, probable dates of latest and earliest killing frosts, and freedom of air drainage. In this way natural frost immunity may generally be secured."
- HUNTER, W. D. (1946)
SOME RECENT STUDIES OF THE MEXICAN COTTON BOLL WEEVIL. U. S. Dept. Agr. Yearbook 1906: 313-324. 1907.
"For a long time it has been recognized that the most important single factor in assisting in the production of a cotton crop in a weevil-infested region is dryness during the growing season."
- HUNTINGTON, ELLSWORTH. (1947)
CIVILIZATION AND CLIMATE. Ed. 2, 333 p. New Haven, Yale university press, 1922.
In chapters 11-13, the author deals with the effect of changes of climate on production and on civilization. He discusses the theory of climatic pulsations and the effect of sunspots on weather conditions, showing that the location of storms shifts in harmony with variations in the activity of the sun.
- THE CLIMATIC FACTOR AS ILLUSTRATED IN ARID AMERICA. 341 p. Washington, D. C., Carnegie institution, 1914. (1948)
In Ch. XIX on the solar hypothesis the author discusses objections to the theory of an 11-year climatic cycle due to sun spots.
- THE HIGH COST OF WEATHER. Rev. Reviews 75 (1): 38-42. Jan., 1927. (1949)
This article contains a brief description of the effect of the weather of 1926 on wheat, cotton, apples, and corn.
- TREE GROWTH AND CLIMATIC INTERPRETATIONS. In Quaternary Climates. p. 157-204. (Carnegie Inst. Wash. Pub. 32.) 1925. (1950)
"The present study is limited to the relation of precipitation and temperature to tree growth from year to year."
- HURD-KARRER, ANNIE M. (1951)
THE FORMATIVE EFFECT OF DAY LENGTH ON WHEAT SEEDLINGS. Md. Acad. Sci., Jour., 1: 115-126. Apr., 1930.
The experiments described demonstrate "the importance of a short day for the initiation of the 'rosette' growth habit in fall-sown winter-

HURD-KARRER, ANNIE M.—Continued.

wheat plants, and [give] evidence of the interrelationship of this factor with temperature and some soil conditions, apparently moisture supply. This resting period, if not essential, is at least conducive to the subsequent normal growth and maturation of the plants."

(952)

RELATION OF LEAF ACIDITY TO VIGOR IN WHEAT GROWN AT DIFFERENT TEMPERATURES. *Jour. Agr. Research* 39: 341-350. Sept. 1, 1929.

"This investigation of the effect of temperature on leaf acidity was suggested by observations which indicated that any growth condition causing a decrease in the vegetative vigor of the wheat plant results in an increase in the acidity of its juice."

HURSH, C. R.

(953)

THE RELATION OF TEMPERATURE AND HYDROGEN-ION CONCENTRATION TO UREDINIOSPORE GERMINATION OF BIOLOGIC FORMS OF STEM RUST OF WHEAT. *Phytopathology* 12: 353-361. Aug., 1922.

HURST, H. E.

(954)

THE FREQUENCY OF LOW TEMPERATURES IN THE SUDAN AND ITS EFFECT ON THE COTTON CROP. *Cairo Sci. Jour.* 7: 265-268. Dec., 1913.

Abstract in *Internatl. Inst. Agr. [Rome] Bul. Agr. Intel. and Plant Diseases* 5: 456. Apr., 1914.

The author gives the results of studies showing the approximate effect of low temperature upon the cotton crop.

HUTCHESON, T. B. and QUANTZ, K. E.

(955)

THE EFFECT OF GREENHOUSE TEMPERATURES ON THE GROWTH OF SMALL GRAINS. *Jour. Amer. Soc. Agron.* 9: 17-21. Jan. 1917.

Contains an account of experiments made to ascertain the effects of temperature on wheat, rye, barley, and oats.

HYDE, ARTHUR M.

(955a)

THE 1930 DROUGHT. U. S. Dept. Agr. Rpt. Sec. p. 1-5. Nov. 15, 1930.

Some of the effects of the drought are indicated, and the Government relief measures are outlined.

A number of studies of the drought situation and of measures for its relief have been made by the United States Department of Agriculture. They are available in printed or mimeographed form.

IHERING, HERMANN VON.

(956)

DER PERIODISCHE BLATTWECHSEL DER BÄUME IM TROPISCHEN UND SUBTROPISCHEN SÜDAMERIKA. *Bot. Jahrb. System. Pflanzengeschichte u. Pflanzengeographie* 58: 524-598. 1923.

Temperature, rainfall, and periodicity in the falling of leaves from trees in South America are studied.

IHNE, EGON.

(957)

ÜBER BEZIEHUNGEN ZWISCHEN PFLANZENPHÄNOLOGIE UND LANDWIRTSCHAFT. 35 p. Berlin, Deutsche Landwirtschafts Gesellschaft, 1909.

A discussion of the relation between plant phenology and agriculture.

ILJIN, WASIL S.

(958)

DER EINFLUSS DES WASSERMANGELS AUF DIE KOHLENSTOFFASSIMILATION DURCH DIE PFLANZEN. *Flora* 116: 360-378. 1923.

The influence of drought on carbon assimilation by plants.

(959)

EINFLUSS DES WELKENS AUF DIE ATMUNG DER PFLANZEN. *Flora* 116: 379-403. 1923.

The influence of wilting on plant respiration.

(960)

L'INFLUENCE DE LA SÉCHERESSE SUR LA RÉGULATION DES STOMATES ET SUR L'ACCROISSEMENT DES PLANTES. *Preslia* 2: 43-55. 1922.

The effect of drought on plant growth is discussed.

(961)

RELATION OF TRANSPIRATION TO ASSIMILATION IN STEPPE PLANTS. *Jour. Ecology* 4: 65-92. June, 1916.

Drought resistance in steppe plants is studied. "It should be noted that the relation of assimilation to transpiration in different species is of importance only when the moisture is at its minimum. In meadow, wood or swamp, and generally in places with an abundant water supply, distribution will be controlled by other factors such as light, . . . etc. The experiments here described simply show that we may expect to find in drought-resistant plants a more economical evaporation of water . . ."

IMMER, F. R., and CHRISTENSEN, J. J.

(1962)

INFLUENCE OF ENVIRONMENTAL FACTORS ON THE SEASONAL PREVALENCE OF CORN SMUT. *Phytopathology* 18: 589-598. July, 1928.

"Dry weather conditions, as expressed by a low number of days of precipitation and a high percentage of sunshine, were found to be conducive to the prevalence of smut. Temperature was not so important a factor as either number of days of precipitation or percentage of sunshine."

INAMDAR, R. S., and SINGH, B. N.

(1963)

THE GROWTH OF THE COTTON PLANT IN INDIA. II. THE PREDETERMINATION OF SUBSEQUENT GROWTH VARIABILITY AND VARIATION IN THE "GROWTH RESISTANCE POTENTIAL" AT THE EARLY SEEDLING PHASE (AS STUDIED BY A QUANTITATIVE ANALYSIS OF GROWTH DATA IN DIFFERENT SEASONS), AND ITS EXPLANATION IN TERMS OF EXTERNAL FACTORS (TEMPERATURE) AND INTERNAL CONDITIONS (HYDRATION OF GROWING TISSUE). *Agr. Jour. India* 25 (pt. 2): 117-120. Mar., 1930.

Abstract of a paper presented before the Indian Science Congress, Allahabad, Jan., 1930.

"Among causative factors in predetermination, temperature effects appear to be the most important. Radiation effects do not assume significant proportions in the open in the tropics."

and SINGH, B. N.

(1964)

STUDIES IN THE RESPIRATION OF TROPICAL PLANTS. 1. SEASONAL VARIATIONS IN AEROBIC AND ANAEROBIC RESPIRATION IN THE LEAVES OF *ARTOCARPUS INTEGRIFOLIA*. *Jour. Indian Bot. Soc.* 6 (3-4): 132-212. 1927.

Abstract in *Expt. Sta. Rec.* 61: 816-817. Dec., 1929.

In investigations made at Benares, "it was found that, unlike the case in temperate regions, the minimum of respiration intensity was obtained in this tropical area in the summer season, the intensity increasing as winter approached and reaching its maximum in the winter leaves; also, the hourly march of respiration varied greatly for successive seasons . . . The adaptational nature of these phenomena as noted in connection with temperature conditions prevailing in different seasons is discussed."

INFLUENCE DE LA NEIGE SUR LE DÉVELOPPEMENT DE LA VÉGÉTATION AU PRINTEMPS. *Nature [Paris]* 48: 179-180. Apr. 17, 1920.

(1965)

This article refers to the findings of M. Peyriguey Jacques to the effect that snow protects vegetation against freezing, and that melting snow supplies nitrogen compounds to soil and plants.

L'INFLUENCE DES PHÉNOMÈNES MÉTÉOROLOGIQUES SUR LA VÉGÉTATION. *Rev. Sci.* 58: 115-116. Feb. 28, 1920.

(1966)

Contains a brief review of the work of Professor Azzi on the relation between critical periods in plant growth and meteorological factors, such as rainfall, humidity, frost, heat, and drought.

INTERNATIONAL CONFERENCE ON PLANT HARDINESS AND ACCLIMATIZATION. NEW YORK, 1907. PROCEEDINGS.

(1967)

Contains the following papers: Factors Affecting the Seasonal Activities of Plants, by D. T. MacDougal; Air Drainage as Affecting the Acclimatization of Plants, by Ernst A. Bessey; The Real Factors in Acclimatization, by F. E. Clements; Evaporation as a Climatic Factor Influencing Vegetation, by B. E. Livingston; Resistance to Cold, Heat, Wet, Drought, Soils, Insects, Fungi, in Grapes, by T. V. Munson; Is Acclimatization an Impossibility? by N. E. Hansen; Developing Hardy Fruits for the North Mississippi Valley, by S. B. Green; Cooperative Methods of Ascertaining Hardiness in Fruits, by H. L. Hutt; Factors Affecting Hardiness of the Peach, by U. P. Hedrick; Observations on Hardiness of Plants Cultivated at the New York Botanical Garden, by Geo. V. Nash.

IRVING, A. A.

(1968)

THE BEGINNING OF PHOTOSYNTHESIS AND THE DEVELOPMENT OF CHLOROPHYLL. *Ann. Bot. [London]* 24: 805-818. Oct., 1910.

"This work deals with the question of how soon the power of photosynthesis attains an appreciable magnitude when young leaves are developing in light, and when leaves that have been etiolated in the dark are exposed to light and turn green."

- IRWIN, J. O. (968a)
AGRICULTURAL METEOROLOGY. *Nature* [London] 126 (3166): 39. 1930.
A brief account of the proceedings at the meeting of the commission of agricultural meteorology of the International Meteorological Organization at Copenhagen in 1929.
- ISELL, C. L. (969)
OBSERVATIONS ON WINTER INJURY OF ORCHARDS. *Ala. Farmer* 5 (8): 6, 18. May, 1925.
- IVANOV, LEONID A. (970)
THE PRESENT STATE OF THE QUESTION OF DROUGHT RESISTANCE. *Trudy Prikl. Bot. i Selekt. (Bul. Appl. Bot. and Plant Breeding)* 13: 3-32. 1922.
In Russian. English summary: p. 31-32.
- _____. (971)
SOLAR RADIATION AS AN ECOLOGICAL FACTOR. *Trudy Prikl. Bot. i Selekt. (Bul. Appl. Bot. and Plant Breeding)* 18: 345-368. 1928.
- _____. (972)
DIE SONNENENERGIE WÄHREND DER VEGETATIONSPERIODE IN LENINGRAD (LESNOJ) UND IHRE AUSNUTZUNG DURCH DIE PFLANZE. *Mitt. Leningrader Forstinst.* 33: 83-130. 1926.
In Russian, with German summary.
The influence of radiant energy on plants is discussed.
- _____. (973)
DIE SONNENSTRAHLUNG ALS FAKTOR DER PFLANZENGEOGRAPHIE UND ÖKOLOGIE. *Biol. Zentbl.* 49: 493-509. 1929.
Light tolerance of plants and its importance in their distribution are discussed.
- _____. (974)
ÜBER DEN EINFLUSS DER TEMPERATUR AUF DIE CHLOROPHYLLZERSETZUNG DURCH DAS LICHT. *Biochem. Ztschr.* 131: 140-144. July 29, 1922.
- _____. (975)
ÜBER DIE TRANSPIRATION DER HOLZGEWÄCHSE IM WINTER. *Ber. Deut. Bot. Gesell.* 42: 44-49, 210-218. 1924.
A study of the effect of low temperature on transpiration of woody plants.
- _____. and THIELMANN, M. (976)
ÜBER DEN EINFLUSS DES LICHTES VERSCHIEDENER WELLENLÄNGE AUF DIE TRANSPIRATION DER PFLANZEN. *Flora* 116: 296-311. 1923.
The influence of light of different wave lengths on the transpiration of plants is studied.
- _____. and TILMAN, M. F. (977)
SUR L'INFLUENCE DE LA COMPOSITION DE LA LUMIÈRE SUR LA TRANSPIRATION. *Jour. Soc. Bot. Russie* 6: 81-96. 1921.
In Russian with French résumé, p. 96.
The influence of different light rays on transpiration of leaves is discussed.
- IVANOV, NICHOLAUS N., and LISHKEVICZ, M. I. (978)
ON THE LOSS OF NITROGEN BY THE DRYING OF PLANTS. *Trudy Prikl. Bot. i Selekt. (Bul. Appl. Bot. and Plant Breeding)* 21: 351-390. 1928-29.
In Russian with English summary.
- JACCARD, PAUL. (979)
ÜBER DIE MECHANISCHEN UND PHYSIOLOGISCHEN WIRKUNGEN DES WINDES AUF DIE GESTALT DER BAUMSTÄMME. *Schweiz. Ztschr. Forstw.* 81 (3): 87-99. Mar., 1930.
A study of the mechanical and physiological effect of wind on tree trunks.
- JACK, H. W., and JAGOE, R. B. (980)
EVAPORATION IN RICE FIELDS. *Malayan Agr. Jour.* 16: 381-385. Nov., 1928.
Figures are given which show that the rate of evaporation in rice fields is fairly constant throughout the year and shows no definite relation to rainfall, wind, sunshine, or temperature, although naturally affected by them.
- JACOB, S. M. (981)
CORRELATION OF RAINFALL AND THE SUCCEEDING CROPS WITH SPECIAL REFERENCE TO THE PUNJAB. *India Met. Dept. Mem.* 21 (pt. 14): 130-146. 1916.
Published also in *Agr. Jour. India, Sci. Congress number.* p. 86-102. 1916.

JACOB, S. M.—Continued.

Studies of the relation between the July, August, September, and October rainfall and the area sown to crops, and between the September-March rainfall and the yield of crops are reported. "To sum up the method of correlation enables us to establish prediction formulae of both sowings and yield, which represent with accuracy the effect rainfall has on crops."

(1982)

CROP AND WEATHER DATA IN INDIA AND THEIR STATISTICAL TREATMENT. Agr. Jour. India, 22: 269-280. July, 1927.

The author distinguishes between agronomic meteorology and agricultural meteorology. "The former is concerned with the weather conditions which induce the cultivator to plough and sow land or to refrain from plowing and sowing it or affect his capacity to do these things; the latter science has to deal with the problem of the reactions of the plant, once the seed is sown, to the weather conditions, whether these are represented by the integrated effects of rain and sunshine and so forth prior to seedling, or to the meteorological factors current during growth."

"Fairly favourable as conditions in India are for the study of agricultural meteorology, yet for the solution of the problems of agronomic meteorology the data provided by Northern India are unsurpassed in the whole world for the space and time they cover, their accuracy and their continuity."

(1983)

CROP AND WEATHER DATA IN INDIA AND THEIR STATISTICAL TREATMENT. Trop. Agr. 75: 11-20. July, 1930.

Not seen.

(1984)

ON THE CORRELATIONS OF AREAS OF MATURED CROPS AND THE RAINFALL, AND CERTAIN ALLIED PROBLEMS IN AGRICULTURE AND METEOROLOGY. (A PRELIMINARY ENQUIRY). Asiatic Soc. Bengal, Mem. 2: 347-429. 1910.

The paper is divided into three parts. Part 1 deals with the interdependence of the crop and the rainfall which enables it to come to maturity. Part 2 deals with the distribution of rainfall by the method of curve fitting developed by Prof. Karl Pearson. In Part 3, the change of rainfall from year to year is considered. Statistical tables of rainfall are appended.

JACOBI, HELENE.

(1985)

EINWIRKUNG VON FEUCHTIGKEIT UND LICHT AUF DAS LÄNGENWACHSTUM VON KEIMLINGEN. Österr. Bot. Ztschr. 64: 94-101. 1914.

It is found that the presence of moisture decreases the effect of light intensity on plant growth.

JANSSEN, GEORGE.

(1986)

EFFECT OF DATE OF SEEDING OF WINTER WHEAT ON PLANT DEVELOPMENT AND ITS RELATIONSHIP TO WINTER HARDINESS. Jour. Amer. Soc. Agron. 21: 444-466. Apr., 1929.

"Grain yields for the three years, 1922 to 1924 inclusive, are directly correlated with the amount of winter killing."

(1987)

EFFECT OF DATE OF SEEDING OF WINTER WHEAT UPON SOME PHYSIOLOGICAL CHANGES OF THE PLANT DURING THE WINTER SEASON. Jour. Amer. Soc. Agron. 21: 168-200. Feb., 1929.

Winter hardiness in wheat is studied.

JAQUES, HARRY E.

(1988)

SOME PHENOLOGICAL RECORDS OF SPRING FLOWERING PLANTS OF HENRY COUNTY. Iowa Acad. Sci., Proc. 25: 413-415. 1918.

"The accompanying table shows the date for each of four years on which the first flower of a number of representative plants was collected."

(1989)

A 10-YEAR PHENOLOGICAL RECORD OF THE SPRING FLOWERING PLANTS OF HENRY COUNTY. Iowa Acad. Sci. Proc. 31: 225-227. 1924.

"Some three dozen plants have been selected as representative, and their early flowering dates for the 10 years, as well as the average dates are given . . . Some plants are more responsive than others to climatic changes of brief duration."

- JARDINE, W. M. (190)
EFFECT OF RATE AND DATE OF SOWING ON YIELD OF WINTER WHEAT. Jour. Amer. Soc. Agron. 8: 163-166. Mar.-Apr., 1916.
"From field observations, it is clearly evident that Turkey winter wheat stools very heavily when sown early in the season . . . as the season advances and the weather becomes cooler, less and still less stooling takes place."
- JEHL, ROBERT A. (191)
PEACH CANKERS AND THEIR TREATMENT. 64 p. Ithaca, 1914. (N. Y. Cornell Agr. Expt. Sta. Circ. 26.)
The effect of weather conditions on peach canker is indicated.
- JENSEN, HARRY. (192)
HEAT INJURY TO EARLY POTATOES AT HARVEST TIME. Amer. Soc. Hort. Sci. Proc. 1928: 27-28.
"90° F. can be called the danger point in harvesting early potatoes."
- JENSEN, I. J. (193)
WINTER WHEAT STUDIES IN MONTANA WITH SPECIAL REFERENCE TO WINTER KILLING. Jour. Amer. Soc. Agron. 17: 630. Oct., 1925.
This is an abstract of a paper read at the ninth annual meeting of the western section of the American Society of Agronomy held at Fort Collins, Colo., June 18 to 20, 1925. It discusses problems arising from winter killing of wheat.
- JENSEN, PETER B. (194)
STUDIES ON THE PRODUCTION OF MATTER IN LIGHT- AND SHADOW-PLANTS. Bot. Tidsskr. 36: 219-262. 1918.
- (195)
STUDIES ON TRANSPIRATION IN HIGH-MOOR PLANTS. Bot. Tidsskr. 36: 144-154. 1917.
- JEVONS, W. STANLEY. (196)
INVESTIGATIONS IN CURRENCY AND FINANCE . . . Ed., with an introduction, by H. S. Foxwell. 414 p. London, Macmillan & Co., 1884.
In this volume are reprinted several papers written by the author from 1875 to 1882 in which he attempts to work out the Herschel theory of the synchronism of sunspots and the yield of crops, p. 194-243.
By studying the records of British trade from 1721 to 1878 he found that the average length of the commercial cycle was 10.466 years which was practically the same as the sun-spot cycle of 10.45 years. He declared himself "perfectly convinced that these decennial crises do depend upon meteorological variations of like period, which again depend, in all probability, upon cosmical variations of which we have evidence in the frequency of sun-spots, auroras, and magnetic perturbations."
- JOHANN, HELEN. (197)
INFLUENCE OF TEMPERATURE ON THE MORPHOLOGY OF FUSARIUM SPORES. (Abstract) Phytopathology 13: 51. Jan., 1923.
Abstract of paper presented at the fourteenth annual meeting of the American Phytopathological Society, Boston, Mass. Dec. 27-30, 1922.
"The effect of absence of light at low temperatures has not yet been determined."
- JOHNSON, ARNOLD H., and WHITCOMB, W. O. (198)
A COMPARISON OF SOME PROPERTIES OF NORMAL AND FROSTED WHEATS. 66 p. Bozeman, Mont., 1927. (Mont. Agr. Expt. Sta. Bul. 204.)
"The severity of the damage appeared to depend upon the moisture content of the wheat kernels at the time of frost and the temperature and duration of such frost."
- JOHNSON, DUNCAN S. (199)
THE INFLUENCE OF INSOLATION ON THE DISTRIBUTION AND ON THE DEVELOPMENTAL SEQUENCE OF THE FLOWERS OF THE GIANT CACTUS OF ARIZONA. Ecology 5: 70-82. Jan., 1924.
"In all the scores of blooming crowns of *Carnegiea* observed near Tucson the flowers of the east side develop more rapidly and begin to open first. Those of the west side develop more slowly and first begin to open many days after blooming has started on the east side . . . The conclusion is reached that [the] higher average temperature brings the tissue of the east side nearer the optimum temperature for growth, and thus is responsible for the earlier maturing of the flowers of this side."

- JOHNSON, HARLEY N. (1000)
ALFALFA GROWING IN WESTERN SOUTH DAKOTA. U. S. Mo. Weather Rev. 47: 328-329. May, 1919.
Discusses the effect of weather conditions on alfalfa growing in South Dakota.
- JOHNSON, JAMES. (1001)
THE RELATION OF AIR TEMPERATURE TO CERTAIN PLANT DISEASES. *Phytopathology* 11: 446-458. Nov., 1921.
The author has made a study of the influence of air temperature upon the mosaic disease of tobacco, a bacterial leaf spot of tobacco, and upon the late blight of potato.
- THE RELATION OF AIR TEMPERATURE TO THE MOSAIC DISEASE OF POTATOES AND OTHER PLANTS. *Phytopathology* 12: 438-440. Sept., 1922. (1002)
- JOHNSON, EARL S. (1003)
THE FREEZING OF PEACH BUDS. U. S. Mo. Weather Rev. 49: 231. Apr., 1921.
This is the author's abstract of a paper presented before the American Meteorological Society, in Washington, D. C., Apr. 20, 1921. Experiments carried on at the University of Maryland Agricultural Experiment Station indicate that "a period of cold weather immediately following a rain is . . . more dangerous to a peach orchard than cold weather alone." A table illustrates the change in resistance offered by peach buds of the Elberta variety to low temperatures.
- AN INDEX OF HARDINESS IN PEACH BUDS. *Amer. Jour. Bot.* 6: 373-379. Nov., 1919. (1004)
The author discusses the effect of low temperatures on the moisture content of fruit buds of two varieties of peach trees.
- MOISTURE CONTENT OF PEACH BUDS IN RELATION TO TEMPERATURE EVALUATIONS. *Bot. Gaz.* 74: 314-319. Nov., 1922. (1005)
"The observations discussed in this paper . . . suggest a definite relationship between air temperature and the rate of increase in the moisture content of peach fruit buds. There can be little doubt, however, that other conditioning influences are operative before January 1, that determine the manner in which these buds responded to temperature."
- MOISTURE RELATIONS OF PEACH BUDS DURING WINTER AND SPRING. p. 59-86. College Park, 1923. (*Md. Agr. Expt. Sta. Bul.* 255.) (1006)
A relation is found between moisture index and temperature.
- UNDERCOOLING OF PEACH BUDS. *Amer. Jour. Bot.* 9: 93-98. Mar., 1922. (1007)
Data obtained indicate that "a period of cold weather immediately following a rain is apparently more dangerous to fruit buds of the peach than cold weather alone."
- JOLEAUD, L. (1008)
LE RÉGIME DES PLUIES ET LES ZONES DE VÉGÉTATION DU MAROC. *Nature* [Paris] 53: 293-301. Nov. 7, 1925.
The influence of rainfall on the vegetation of Morocco is discussed.
- JONES, EDITH S. (1009)
INFLUENCE OF TEMPERATURE, MOISTURE, AND OXYGEN ON SPORE GERMINATION OF *USTILAGO AVENAE*. *Jour. Agr. Research* 24: 577-591. May 19, 1923. (1010)
- INFLUENCE OF TEMPERATURE ON THE SPORE GERMINATION OF *USTILAGO ZEAE*. *Jour. Agr. Research* 24: 593-597. May 19, 1923. (1011)
- JONES, FRED R. (1011)
BACTERIAL WILT OF ALFALFA. *Jour. Amer. Soc. Agron.* 22: 568-572. June, 1930.
The relation of winter injury to wilt is discussed.
- DEVELOPMENT OF THE BACTERIA CAUSING WILT IN THE ALFALFA PLANT, AS INFLUENCED BY GROWTH AND WINTER INJURY. *Jour. Agr. Research* 37: 545-569. Nov. 1, 1928. (1012)
"In the course of the study of bacterial wilt of alfalfa, observation of the disease in the field has suggested that winter injury of alfalfa

JONES, FRED R.—Continued.

plants provides wounds through which the bacteria often enter the plant. Following this suggestion, the relation of the bacteria to the host plant has been examined, and in this paper this relation and the effect of freezing injury upon the development of the disease are described."

(1013)

WINTER INJURY OF ALFALFA. Jour. Agr. Research 37: 189-211. Aug. 15, 1928.

A detailed account is given of winter injury to alfalfa roots and crowns. Its effect in shortening the life of the plant is pointed out.

— and WEIMER, J. L.

(1014)

BACTERIAL WILT AND WINTER INJURY OF ALFALFA. 8 p. Washington, D. C., Govt. print. off., 1928. (U. S. Dept. Agr. Circ. 39.)

"Winter injury results in the killing of buds and of parts of the root and crown of the alfalfa plant during the winter. [It] causes wounds through which the bacteria producing wilt may easily enter if they are present in a field. Thus fields are often destroyed by bacterial wilt after they have been injured during an unfavorable winter."

JONES, JENKIN W.

(1015)

GERMINATION OF RICE SEED AS AFFECTED BY TEMPERATURE, FUNGICIDES, AND AGE. Jour. Amer. Soc. Agron. 18: 576-591. July, 1926.

The effect of different degrees of temperature on the germination of rice seed is studied.

(1016)

OBSERVATIONS ON THE TIME OF BLOOMING OF RICE FLOWERS. Jour. Amer. Soc. Agron. 16: 665-670. Oct., 1924.

"The temperature and condition of the atmosphere have a marked influence on the time of blooming of rice."

JONES, L. R.

(1017)

THE RELATION OF ENVIRONMENT TO DISEASE IN PLANTS. Amer. Jour. Bot. 11: 601-609. Dec., 1924.

Contains a brief reference to the effect of air temperature on some orchard diseases.

— MILLER, M., and BAILEY, E.

(1018)

FROST NECROSIS OF POTATO TUBERS. 46 p. Madison, 1919. (Wis. Agr. Expt. Sta. Research Bul. 46.)

The author discusses the damage done to the potato crop by freezing.

JONES, MARTIN G.

(1019)

THE GROWING OF WINTER OATS. Jour. Min. Agr. [Gt. Brit.] 33: 425-437. Aug., 1926.

A study of winter oats at the Welsh plant breeding station during the seasons 1920-1925 was made and their resistance to weather conditions noted.

JUNGNER, J. R.

(1020)

ÜBER DEN KLIMATISCH-BIOLOGISCHEN ZUSAMMENHANG EINER REIHE GETREIDE-KRANKHEITEN WÄHREND DER LETZTEN JAHRE. Ztschr. Pflanzenkrank. 14: 321-347. Jan. 10, 1905.

The effect of frost on grain diseases is discussed.

(1021)

ÜBER DIE FROSTBESCHÄDIGUNG DES GETREIDES IM VERGANGENEN WINTER UND DIE BEGLEITENDE PILZBESCHÄDIGUNG DESSELBEN. Ztschr. Pflanzenkrank. 11: 343-344. Feb. 15, 1902.

Frost injury to grain and resultant fungus growth are briefly discussed.

KAIGORODOFF, A.

(1022)

[THE PRESENT STATUS AND OUTLOOK OF AGRICULTURAL METEOROLOGY.] Met. Ztschr. 46: 399-400.

Original not seen. Abstract in Expt. Sta. Rec. 62: 313. Mar., 1930.

"The present status and the outlook of agricultural meteorology are briefly summed up in 12 theses, which emphasize especially the importance of more intensive study of meteorological conditions immediately surrounding cultivated plants, including light as well as temperature and moisture; studies under controlled conditions which make possible the more exact evaluation of the effect of the different factors; and coordination of the work of the meteorologist with that of the chemist, the physiological botanist, and others."

- KAMENICKÝ, KARL. (1023)
 DER ÜBERBLICK DER FROSTSCHÄDEN AN OBSTBÄUMEN IN DER TSCHECHOSLOWAKEN.
 Gartenbauwissenschaft 3: 273-276. Apr. 24, 1930.
 A brief account of frost damage to fruit trees in Czechoslovakia in 1929.
- KAPTEYN, J. C. (1024)
 TREE-GROWTH AND METEOROLOGICAL FACTORS. Rec. Trav. Bot. Néerland. 11: 70-93. 1914.
 The relation between temperature, rainfall, and the growth of the oak tree is discussed in connection with an investigation made in 1880-81.
- KARCHEVSKI. (1025)
 INFLUENCE OF THE FLUCTUATION OF TEMPERATURE ON THE RESPIRATION OF SEEDS AND EMBRYOS OF WHEAT. Warsaw Univ. Mem. 9: 114. 1901.
 Abstract in Zhur. Opytn. Agron. Tugo-Vostoka (Jour. Expt. Landw. Südost. Eur.—Russlands) 3: 241. 1902.
 Abstract in Expt. Sta. Rec. 14: 829. May, 1903.
 "The investigations here reported were conducted to ascertain how the seeds and embryos of wheat are affected by being subjected to elevated temperatures."
- KARLING, JOHN S. (1026)
 A PRELIMINARY ACCOUNT OF THE INFLUENCE OF LIGHT AND TEMPERATURE ON GROWTH AND REPRODUCTION IN CHARA FRAGILIS. Torrey Bot. Club. Bul. 51: 469-488. Dec., 1924.
- KASERER, HERMANN. (1027)
 DIE BEZIEHUNGEN ZWISCHEN BODENTEMPERATUR UND LUFTTEMPERATUR IN IHREM EINFLUSS AUF DEN ERNTERERTRAG. Fortschr. Landw. 2: 205-212. Apr., 1927.
 Abstract in Internatl. Rev. Agr. [Rome] May, 1927, p. 554.
 "The author, in his investigations on the cause of the poor corn [grain] harvest of 1924 in the Danube districts . . . was able to determine the important influence of the relation existing between soil and air temperatures on plant growth and hence on the final crop."
- KASSNER, C. (1028)
 DER EINFLUSS DES WEITERS AUF DIE PFLANZE, BESONDERS HINSICHTLICH DES SONNENNSCHEINS UND REGENS. Mitt. Deut. Landw. Gesell. 21: 276-278. June 30, 1906.
 The influence of rainfall and sunshine on plant life is briefly discussed.
- and HILLMANN. (1029)
 DIE WITTERUNG IM SOMMER 1907 UND IHR EINFLUSS AUF DEN LANDWIRTSCHAFTLICHEN BETRIEB. Jahrb. Deut. Landw. Gesell. 22: 765-778. Dec., 1907.
 The weather of 1907 is discussed in its relation to farm management.
- KEARNEY, THOMAS H., and SHANTZ, H. L. (1030)
 THE WATER ECONOMY OF DRY-LAND CROPS. U. S. Dept. Agr. Yearbook 1911: 351-362. 1912.
 Drought resistance is discussed.
- KEEBLE, FREDERICK. (1031)
 PLANTS AND THE RHYTHM OF THE SEASONS. Gard. Chron. (3) 59: 260-261, 272. May 13, 1916.
 "In normal years water supply is the limiting factor of plant-growth and fertility."
- KEENER, ALICE E. (1032)
 A STUDY OF THE FACTORS CONCERNED IN THE REDDENING OF LEAVES OF DIERVILLA LONICERA. Amer. Jour. Bot. 11: 61-77. Feb., 1924.
 It is found that the reddening of the leaves of Diervilla lonicera, or bush honeysuckle, is largely due to extreme sunlight.
- KETT, GEORGE W. (1033)
 SOME RELATIONS OF ENVIRONMENT TO THE EPIDEMIOLOGY AND CONTROL OF APPLE SCAB. Natl. Acad. Sci. Proc. 12: 68-74. Feb., 1926.
 Relations of temperature and moisture are considered.
- and JONES, LEON K. (1034)
 STUDIES OF THE EPIDEMIOLOGY AND CONTROL OF APPLE SCAB. 104 p. Madison, 1926. (Wis. Agr. Expt. Sta. Research Bul. 73.)
 It is shown that moisture and temperature play an important part in determining the severity of the disease and the difficulty of its control.

- KELLERMAN, K. F. (1035)
A REVIEW OF THE DISCOVERY OF PHOTOPERIODISM: THE INFLUENCE OF THE LENGTH OF DAILY LIGHT PERIODS UPON THE GROWTH OF PLANTS. *Quart. Rev. Biol.* 1: 87-94. Jan., 1926.
- KELSICK, R. E. (1036)
SOME OBSERVATIONS ON THE RELATION OF LINT LENGTH TO RAINFALL. *West Indian Bul.* 17 (2): 79-82. 1918.
There is shown to be a definite appearance of correlation between rainfall and the ultimate length of lint attained.
- KEMP, W. B., and METZGER, J. E. (1037)
ENVIRONMENTAL FACTORS INFLUENCING WHEAT PRODUCTION IN MARYLAND. p. 125-173. College Park, 1928. (Md. Agr. Expt. Sta. Bul. 297.)
"It has been noted that a change has occurred in the weather effect upon wheat yields, accompanied by a change in relative position of the different wheat response groups."
- KENOYER, LESLIE A. (1038)
ENVIRONMENTAL INFLUENCES ON NECTAR SECRETION. p. 219-232. Ames, 1916. (Iowa Agr. Expt. Sta. Research Bul. 37.)
"By increasing humidity, the secretion of water, but not that of sugar, from nectaries is increased. Excessive water supply lessens the sugar surplus in the parts of the flower. Dilution and washing by rain causes much of the sugar of nectar to be lost. Rate of secretion for both sugar and water increases with temperature up to a certain optimum. Accumulation of sugar in the flower and its vicinity varies inversely as the temperature. The optimum condition for sugar secretion is an alternation of low and high temperatures. Variation of atmospheric pressure has no marked influence on secretion. Sugar secretion is markedly diminished in darkness. . . . Nectar is most abundant early in the blooming season, all things being equal. Accumulation and secretion of sugar is most pronounced near the time of the opening of the flower."
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- THE WEATHER AND HONEY PRODUCTION. 26 p. Ames, 1917. (Iowa Agr. Expt. Sta. Bul. 169.)
"The weather and its changes exert a marked influence on honey production . . . June yields 56 per cent of the annual hive increase, July about half of the remainder . . . A good year has a rainfall slightly above the average . . . South wind seems favorable and east wind unfavorable . . . Good honey months average slightly higher in temperature than poor . . . A wide daily range of temperature is favorable for a good yield . . . The fluctuations in yield for a producing period seem to be closely correlated with the temperature range and the barometric pressure, acting jointly . . . A cold winter has no detrimental effect on the yield of the succeeding season, but a cold March reduces it."
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- KERÄNEN, J. (1040)
ON THE DEPENDENCE OF THE HARVEST UPON THE TEMPERATURE IN THE FOREGOING WINTER AND MAY. 8 p. Helsinki, 1925. (Mitt. Met. Zentralanst. Finnischen Staates no. 15.)
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- ÜBER DEN BODENFROST IN FINNLAND. 57 p. Helsinki, 1923. Repr. from Mitt. Met. Zentralanst. Finnischen Staates no. 12.
The author discusses the factors determining the distribution of ground temperature in Finland and its effect on agriculture.
- KESTNER, OTTO. (1042)
DIE SONNENSTRAHLUNG IM HOHEN NORDEN. *Naturwissenschaften* 15: 879-882. Nov. 4, 1927.
The effect of the ultra-violet rays of the sun in the far north on plant growth is discussed.
- KHARIZOMENOV, S. (1043)
THE INFLUENCE OF RAIN AND OF TEMPERATURE OF THE AIR ON CEREAL CROPS IN THE GOVERNMENTS OF SARATOV, SAMARA, AND TAMBOV. *Selsk. Khoz. Vĕstnik Ėugo-Vostok*, 1911, no. 4-6.
In Russian.
Not examined. Reference given as found.
See also item 1295.
Abstract in *Intern. Inst. Agr., Bur. Agr. Intell. and Plant Diseases Bul.* 3: 609-610. Mar., 1912. Abstract also in *Expt. Sta. Rec.* 27: 15. July, 1912.

- KIDD, FRANKLIN. (1044)
REFRIGERATION IN NATURE. [Gt. Brit.] Dept. Sci. and Indus. Research, Food Invest. Bd. Mem. 118: 1-18. 1928. (Cantor lectures on biology and refrigeration).
Contains a brief account of some of the outstanding factors which determine frost injury in plants.
- AND WEST, CYRIL. (1045)
TEMPERATURE AND METABOLIC BALANCE IN LIVING PLANT TISSUES. Internatl. Cong. Refrig. Proc. 4, v. 1, p. 170-185. 1924.
"Temperature not only affects the speed of the vital processes (metabolism), but also controls the metabolic balance and hence influences directly the chemical constitution of plants, their structure, and the precise course of their developmental sequence in growth, maturation and senescence."
- KIENHOLZ, RAYMOND. (1046)
THE EFFECT OF HIGH TEMPERATURES ON THE GERMINATION AND SUBSEQUENT GROWTH OF CORN. Philippine Jour. Sci. 25: 311-346. Sept., 1924.
- KIESSELBACH, T. A. (1047)
TRANSPIRATION AS A FACTOR IN CROP PRODUCTION. 214 p. Lincoln, 1916. (Nebr. Agr. Expt. Sta. Research Bul. 6.)
The relation of transpiration to weather conditions is discussed.
- and RATCLIFF, J. A. (1048)
FREEZING INJURY OF SEED CORN. 96 p. Lincoln, 1920. (Nebr. Agr. Expt. Sta. Research Bul. 16.)
"The object of the investigations in this bulletin has been to determine the conditions under which freezing injury may occur to seed corn; to indicate, if possible, the vital changes in the embryo resulting in such injury; and to point out ways by which seed corn of strong vitality and satisfactory yielding capacity may be obtained."
- KIMBALL, D. A. (1049)
EFFECT OF THE HARDENING PROCESS ON THE WATER CONTENT OF SOME HERBACEOUS PLANTS. Amer. Soc. Hort. Sci. Proc. 1927: 64-70.
- KIMBALL, HERBERT H., and YOUNG, FLOYD D. (1049a)
SMUDGING AS A PROTECTION FROM FROST. U. S. Mo. Weather Rev. 48: 461-462. 1920.
- KINCER, JOSEPH B. (1050)
CLIMATE AND WEATHER INFLUENCE ON THE FRUIT INDUSTRY OF THE UNITED STATES. [Author's abstract.] Amer. Met. Soc. Bul. 6 (1): 12-14. Jan., 1925.
"The weather risk in fruit growing in the United States is relatively much greater than for most other crops, principally because of low winter temperatures damaging twigs or buds, or spring frosts killing advanced buds or blooms . . . The low temperature danger point for fruit blossoms, or for fruit just set, ranges in most cases from 27° to 29° . . . Well developed buds will withstand a lower temperature than after they have opened . . . Records covering a long period of years in Ohio show that . . . there is a very close relation between the temperature during the last 10 days of March and the month of April and the time of blooming."
- (1051)
THE CLIMATE OF THE GREAT PLAINS AS A FACTOR IN THEIR UTILIZATION. Ann. Assoc. Amer. Geogr. 13: 67-80. 1923.
Precipitation and temperature and their effect on the vegetation of the great plains are discussed.
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COMPUTING THE COTTON CROP FROM WEATHER RECORDS AND GINNING REPORTS. U. S. Mo. Weather Rev. 49: 295-299. May, 1921.
"The relation between the amount of cotton ginned during November and the prevailing weather of that month has been mathematically determined as a basis for forecasting the final output."
- (1053)
A CORRELATION OF WEATHER CONDITIONS AND PRODUCTION OF COTTON IN TEXAS. U. S. Mo. Weather Rev. 43: 61-65. Feb., 1915.
The author discusses the influence of precipitation and temperature on the yield of cotton in Texas.

KINCER, JOSEPH B.—Continued.

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THE COTTON PLANT IN RELATION TO TEMPERATURE AND RAINFALL. U. S. Mo. Weather Rev. 52: 306-307. June, 1924.

A brief statement with regard to the influence of temperature and rainfall on the cotton plant.

(1055)

DAYTIME AND NIGHTTIME PRECIPITATION AND THEIR ECONOMIC SIGNIFICANCE. U. S. Mo. Weather Rev. 44: 628-633. Nov., 1916.

The author discusses the relative importance to the farmer of rainfall during the day or at night.

(1056)

FROST FORECASTING INDISPENSABLE IN ORCHARD HEATING. U. S. Dept. Agr. Yearbook 1926: 382-383. 1927.

(1057)

RELATION BETWEEN VEGETATIVE AND FROSTLESS PERIODS. U. S. Mo. Weather Rev. 47: 106-110. Feb., 1919.

A study of the relation of the two basic factors in plant growth, the vegetative temperature and frost, and their variations in length in different sections of the United States.

(1058)

THE RELATION OF CLIMATE TO THE GEOGRAPHIC DISTRIBUTION OF CROPS IN THE UNITED STATES. Ecology 3: 127-133. Apr., 1922.

The author discusses the distribution of crops in the United States from the point of view of their moisture and temperature requirements.

(1059)

RELATION OF WEATHER TO THE AMOUNT OF COTTON GINNED DURING CERTAIN PERIODS. U. S. Mo. Weather Rev. 45: 6-10. Jan., 1917.

"There are two weather factors, operating separately and independently of each other, which largely control the relative amount of cotton ginned from year to year during a given ginning period, and also that ginned during the several periods of any single year. These are the temperature conditions during certain early months of the active growing season, principally May and June, and the amount of fair or rainy weather during the ginning period itself." Cotton cannot be successfully grown "unless the mean summer temperature is at least about 78° F. and the average frostless season about 200 days in length."

(1060)

TEMPERATURE INFLUENCE ON PLANTING AND HARVEST DATES. U. S. Mo. Weather Rev. 47: 312-323. May, 1919.

The author discusses the temperature requirements for the planting and harvesting of a number of crops.

(1061)

WEATHER AND COTTON PRODUCTION. U. S. Mo. Weather Rev. 58: 190-196. May, 1930.

"The present paper has to do with the effect of weather on the yield of cotton in the United States, and includes practically the entire producing area."

(1062)

WEATHER AND THE COTTON BOLL WEEVIL. U. S. Mo. Weather Rev. 56: 301-304. Aug., 1928.

Discusses the effect of weather conditions on the spread of the boll weevil throughout the Cotton Belt.

— and MATTICE, W. A.

(1063)

STATISTICAL CORRELATIONS OF WEATHER INFLUENCE ON CROP YIELDS. U. S. Mo. Weather Rev. 56: 53-55. Feb., 1928.

"The system used in this study segregates, or picks out, from a large number of weather variants, those which, in combination with certain others, contribute to the augmentation of the final multiple coefficient, and discards those which do not make such contribution." This method is outlined as applied to 15 weather variants in North Dakota in relation to the yield of spring wheat, taking the month as the time unit, and to 24 weather variants in Ohio in relation to the yield of corn, on a weekly and biweekly basis."

KING, CYRUS A.

(1064)

EXPERIMENTS TO SHOW THAT THE ABSENCE OF LIGHT ALONE WILL PREVENT THE PROCESS OF PHOTOSYNTHESIS. Torreya 5 (4): 67-68. Apr., 1905.

- KING, T. H. (1065)
RELATION OF DIFFERENCE OF CLIMATOLOGICAL ENVIRONMENT TO CROP YIELDS.
U. S. Dept. Agr., Bur. Soils Bul. 26: 125-205. 1905.
The effect of rainfall, temperature, and sunshine on crop yields is noted at various stations.
- KINZEL, WILHELM. (1066)
ANPASSUNG DER SAMEN AN KLIMATISCHE EINFLÜSSE (BIS ZUR VÖLLIGEN UMKEHR DES KEIMVERLAUFS). Prakt. Bl. Pflanzenbau u. Schutz. 2: 1-5. Apr., 1924.
Some references to the effect of light and frost on seeds. (1067)
- THE BENEFICIAL AND INJURIOUS EFFECTS OF SHORT-WAVE RAYS IN NATURE. Internatl. Rev. Sci. and Pract. Agr. [Rome] (n. s.) 3: 331-337. Apr.-June, 1925.
A brief account of the effect of short-wave light on seed germination. (1068)
- FROST UND LICHT ALS BEEINFLUSSENDE KRÄFTE BEI DER SAMENKEIMUNG; MIT BESONDERER BERÜCKSICHTIGUNG DER ENTWICKLUNG (NACHREIFE, KEIMDAUER, ETC.) UND ANDERER BIOLOGISCHER EIGENTÜMLICHKEITEN DER SAMEN AUS DEN VERSCHIEDENEN PFLANZENFAMILIEN. EIN LEITFADEN FÜR BIOLOGEN, GÄRTNER, SAMENHÄNDLER UND KONTROLLSTATIONEN. 170 p. Stuttgart, E. Ulmer, 1913.
A study of the effect of frost and light on the germination of seeds. (1069)
- FROST UND LICHT ALS BEEINFLUSSENDE KRÄFTE BEI DER SAMENKEIMUNG. ERLÄUTERUNGEN UND ERGÄNZUNGEN ZUM ERSTEN BUCHE. [Nachtrag 1-2.] 2 v. Stuttgart, E. Ulmer, 1915-20.
This is a supplement to the author's book on the effect of frost and light on germination, published in Stuttgart in 1913. (1070)
- FROST UND LICHT ALS BEEINFLUSSENDE KRÄFTE DER SAMENKEIMUNG. Naturw. Ztschr. Forst u. Landw. 13: 433-468. Oct., 1915.
Abstract in Expt. Sta. Rec. 35: 632. Nov., 1916.
The effect of frost and light on a large number of plant families is noted. (1071)
- ÜBER DEN EINFLUSS DES LICHTES AUF DIE KEIMUNG. "LICHTHARTE" SAMEN. Ber. Deut. Bot. Gesell. 25: 269-276. July 24, 1907.
The author studies the effect of light and darkness on the germination of seeds of a number of plants in this and in the following articles of the same publication. Lichtkeimung. Einige Bestätigende und Ergänzende Bemerkungen zu den Vorläufigen Mitteilungen von 1907 und 1908. 26a: 631-645. Nov. 26, 1908. Lichtkeimung, Weitere Bestätigende und Ergänzende Bemerkungen zu den Vorläufigen Mitteilungen von 1907 und 1908. 26a: 654-665. Dec. 19, 1908. Lichtkeimung. Erläuterungen und Ergänzungen. 27: 536-545. Dec. 29, 1909. (1072)
- ÜBER DIE WIRKUNG DES DURCHFRIERENS DER SAMEN AUF DIE KEIMUNG UND DIE BEZIEHUNGEN ZWISCHEN FROST-UND LICHTWIRKUNG. Prakt. Bl. Pflanzenbau u. Schutz. 14: 105-114. Aug., 1911.
A study of the effect of freezing on seed germination and of the relation between the influence of frost and of light. (1072a)
- DIE WIRKUNG DES LICHTES AUF DIE KEIMUNG. Ber. Deut. Bot. Gesell. 26a: 105-115. Mar. 26, 1908.
The effect of light on germination. (1073)
- KIRKWOOD, J. E. (1073)
THE INFLUENCE OF PRECEDING SEASONS ON THE GROWTH OF YELLOW PINE. Torreya 14: 115-125. July, 1914.
The author discusses the effect of rainfall, temperature, sun, and wind on the growth of the yellow pine. (1074)
- KISSELEW, N. N. (1074)
DER TEMPERATUREINFLUSS AUF DIE STÄRKEHYDROLYSE IM MESOPHYLL-UND SCHLIESSZELLEN. Planta Arch. Wiss. Bot. 6: 135-161. July 17, 1928.
A study of the effect of temperature on the starch content of leaves.

- KITCHEN, PAUL C. (1075)
THE EFFECT UPON THE GROWTH OF SOME CONIFEROUS SEEDLINGS OF VARIOUS CONDITIONS OF SHADE AND MOISTURE. Mich. Acad. Sci. Ann. Rpt. 19: 337-356. 1917.
- KLAGES, K. H. (1076)
COMPARATIVE WINTERHARDINESS OF SPECIES AND VARIETIES OF VETCHES AND PEAS IN RELATION TO THEIR YIELDING ABILITY. Jour. Amer. Soc. Agron. 20: 982-987. Sept., 1928.
"Of 20 species and varieties of vetches and peas grown at the Oklahoma Agricultural Experiment station only two species of vetch . . . and one variety of peas . . . were found to survive winter conditions without showing a perceptible percentage of winterkilling . . . The yields of the species and varieties used in the test were found to be in direct relationship to their respective degrees of winterhardiness." (1077)
- METRICAL ATTRIBUTES AND THE PHYSIOLOGY OF HARDY VARIETIES OF WINTER WHEAT. Jour. Amer. Soc. Agron. 18: 529-566. July, 1926.
A study of the degree of association existing between certain physical and physiological properties of winter wheat and winterhardiness and of the factors concerned in the development of winter wheat and the relative behavior of spring and winter varieties. (1078)
- RELATION OF SOIL MOISTURE CONTENT TO RESISTANCE OF WHEAT SEEDLINGS TO LOW TEMPERATURES. Jour. Amer. Soc. Agron. 18: 184-193. Mar., 1926.
"Under extreme depressions of temperature, such as occurred in these investigations, low soil moisture, due to its retardation of the life processes of plants, exerts a protective influence during the first part of the exposure . . . wheat seedlings become more susceptible to low temperatures with advance in age." (1079)
- KLEBS, GEORG. (1079)
ÜBER DAS VERHÄLTNISS VON WACHSTUM UND RUHE BEI DEN PFLANZEN. Biol. Zentbl. 37: 373-415. Aug., 1917.
The relation between growth and rest periods of trees is studied. (1080)
- ÜBER DIE RHYTHMIK IN DER ENTWICKLUNG DER PFLANZEN. 84 p. Heidelberg, C. Winter's Universitätsbuchhandlung, 1911.
Reprint from Sitzber., Akad. Wiss., Heidelberg, Math. Naturw. Kl., Jahrg. 1911, Abhandl. 23.
A study of the rhythmic development of plants. (1081)
- ÜBER PERIODISCH WACHSENDE TROPISCHE BAUMARTEN. Sitzber., Akad. Wiss., Heidelberg, Math. Naturw. Kl., Abhandl. 2, 31 p. 1926.
Periodicity of tropical trees is discussed. (1082)
- KLEIN, PAUL. (1082)
MÉTÉOROLOGIE AGRICOLE ET PRÉVISION DU TEMPS. 528 p. Paris, J. B. Bailière et fils, 1918.
This is one of the volumes of the Encyclopédie Agricole published under the direction of G. Wéry.
The effect on vegetation of temperature, wind, rainfall, hail, and lightning is discussed. (1083)
- KNIEP, H. (1083)
ÜBER DEN RHYTHMISCHEN VERLAUF PFLANZLICHER LEBENSVORGÄNGE. Naturwissenschaften 3: 462-467, 473-477. Sept., 1915.
The rhythmical course of plant life is discussed. (1084)
- and MINDER, F. (1084)
ÜBER DEN EINFLUSS VERSCHIEDENFARBIGEN LICHTES AUF DIE KOHLENSÄURE-ASSIMILATION. Ztschr. Bot. 1: 619-650. 1909.
The influence of different light rays on plant assimilation is discussed. (1085)
- KNIGHT, R. C. (1085)
FURTHER OBSERVATIONS ON THE TRANSPIRATION, STOMATA, LEAF WATER-CONTENT, AND WILTING OF PLANTS. Ann. Bot. [London] 36: 361-383. July, 1922.
"An increase of transpiration rate accompanies the stomatal opening which occurs during the early stages of wilting. There is no correlation between the temperature of the air in which wilting occurs (i. e., presumably the rate of wilting) and the magnitude of the accompanying increase in transpiration rate or the magnitude of the increase of stomatal aperture."

- KNIGHT, R. C.—Continued. (1086)
 "RELATIVE TRANSPIRATION" AS A MEASURE OF THE INTRINSIC TRANSPIRING POWER OF THE PLANT. *Ann. Bot. [London]* 31: 351-359. July-Oct., 1917.
 The influence of temperature, humidity, and wind on plant transpiration is discussed.
- KNIPPEL, K. (1087)
 BEOBSACHTUNGEN ÜBER FROSTBESCHÄDIGUNGEN AN OBSTBÄUMEN. *Obst u. Gemüsebau* 74: 41-42. Mar. 14, 1928.
 Observations on frost damage to fruit trees during the winter of 1925-26.
- KNITTER, ERNST. (1088)
 BEZIEHUNGEN ZWISCHEN DEN KLIMATISCHEN FAKTOREN UND DEM PFLANZENBAU IN SCHLESSEN. *Wiss. Arch. Landw., Abt. A, Pflanzenbau.* 1: 273-329. 1929.
 The effect of temperature, sunshine, rainfall, and wind on plant growth in Silesia is discussed.
- KNOCH, K. (1089)
 DIE MÖGLICHKEIT DER ABSCHÄTZUNG DES ERNTEERTRAGES AUF GRUND METEOROLOGISCHER ANGABEN. *Naturwissenschaften* 11: 769-776. Sept. 14, 1923.
 Abstract in *Expt. Sta. Rec.* 50: 13. Jan., 1924.
 "This is a critical review of the development of agricultural meteorology, especially in the United States . . . with numerous references to the literature of the subject, and with discussion in detail of the various lines of study which have been undertaken or proposed, including particularly correlation, critical period, and forecast studies, and warnings of frost and other untoward conditions."
- KNÖRZER, ALBERT. (1090)
 TEMPERATUR UND VEGETATIONSENTWICKLUNG IM FRÜHLING 1918 IN NORDOST- UND SÜDWESTDEUTSCHLAND. *Arb. Landw. Kammer Hessen Hft. 26, Phaeologische Mitt.* p. 26-30. 1919.
 The author discusses the effect of an unusually hot April on crops in 1918 in northeast and southwest Germany.
- KNOTT, JAMES E. (1091)
 CATALASE IN RELATION TO GROWTH AND TO OTHER CHANGES IN PLANT TISSUE. 63 p. Ithaca, 1927. (N. Y. Cornell Agr. Expt. Sta. Mem. 106.)
 Reproductive response of spinach plants to a daylight period of about 15 hours is found to be located in the apical bud.
- (1092)
 EFFECT OF COLD TEMPERATURE ON GROWTH OF VEGETABLES. *Jour. Amer. Soc. Agron.* 17: 54-57. Jan., 1925.
 The author discusses the question of the time at which temperature is able to upset the normal type of growth. "Depressed temperatures at some period in the growth of biennials rather than low temperatures during germination seem to be the cause of the development of annual habit."
- (1093)
 FURTHER LOCALIZATION OF THE RESPONSE IN PLANT TISSUE TO RELATIVE LENGTH OF DAY AND NIGHT. *Amer. Soc. Hort. Sci. Proc.* 1926: 67-70.
 "The catalase activity of the apical bud of cosmos decreases as the change from vegetative to reproductive growth is caused by subjecting the tip alone to a 10-hour day."
- KNOWLTON, HARVEY E., and SEVY, H. P. (1094)
 THE RELATION OF TEMPERATURE TO POLLEN TUBE GROWTH IN VITRO. *Amer. Soc. Hort. Sci. Proc.* 22: 110-115. 1925.
- KNOWLTON, H. E., and DORSEY, M. J. (1094a)
 A STUDY OF THE HARDINESS OF THE FRUIT BUDS OF THE PEACH. 28 p. Morgantown, 1927. (W. Va., Agr. Expt. Sta. Bul. 211.)
 "The winters of West Virginia are characterized by periods of moderately high temperatures which cause considerable bud growth in the peach. When these high-temperature periods are followed by sudden cold spells, especially toward late winter, conditions occur which favor bud killing."
- KOBAYASI, YAKITI. (1095)
 ÜBER DEN EINFLUSS DER AUSSENBEDINGUNGEN AUF DAS BLÜTENÖFFNEN DER REISPFLANZEN. I-III. *Jour. Sci. Agr. Soc. Tokyo* 274: 239-246, Sept. 5, 1925; 279: 59-72, Feb. 5, 1926; 290: 20-29, 1927.

KOBAYASI, YAKITI—Continued.

German abstracts in Japanese Jour. Bot. 3: Abstracts (23): 15; (95): 31; (260): 88. 1926-27.

The author discusses the effect of atmospheric humidity, of sunlight and darkness, and of temperature on the blooming of the rice plant. The optimum degree of humidity is 70 to 80 per cent. Air saturated with moisture is apt to retard blooming. It is known that blooming is noticeably retarded in darkness as well as when the plant is exposed to low temperatures. The optimum temperature is found to be within 2° of 30° C.

KODAMA, HIROSI. (1096)

[EFFECTS OF CLIMATIC CONDITIONS ON THE YIELDING OF COCOON.] Umi to Sora (Sky and Water) 4: 174-176. 1924.

In Japanese.

Reference in Japan. Jour. Astron. and Geophysics Abs. 3 (3): 29. 1926

"The relations are investigated on a purely statistical ground."

KOENIG, M. (1097)

CRITICAL PERIODS IN THE GROWTH OF THE SUGAR CROP. Mauritius Dept. Agr. Gen. Ser. Bul. 27, 16 p. 1922.

The author points out the critical periods in the growth of the sugar crop during which rainfall and temperature produce a permanent effect.

(1098)

LA CROISSANCE DES CANNES À MAURICE EXPRIMÉE EN TERMES DE L'HUMIDITÉ DU SOL ET DE LA TEMPÉRATURE DE L'AIR. Rev. Agr. Maurice 44: 50-56. Mar.-Apr., 1929.

The author traces a correlation between temperature, humidity, and the growth of sugarcane.

KÖPPEN, WLADIMIR. (1099)

BAUMGRENZE UND LUFTEMPERATUR. Petermanns Mitt. Justus Perthes' Geogr. Anst. 65: 201-203. Nov.-Dec., 1919.

Shows that the northern limit of tree growth is coincident with the location of 70° F. isotherm in July.

(1100)

DER JÄHRLICHE TEMPERATURGANG IN DEN GEMÄSSIGTEN ZONEN UND DIE VEGETATIONSPERIODE. Met. Ztschr. 43: 161-172. May, 1926.

Abstract in Expt. Sta. Rec. 55: 807. Dec., 1926.

"The course of temperature and of the growth of various wild and cultivated trees and other plants at widely separated places is reviewed."

(1101)

VERHÄLTNIS DER BAUMGRENZE ZUR LUFTEMPERATUR. Met. Ztschr. 37: 39-42. 1920.

Abstract in Internatl. Rev. Sci. and Pract. Agr. [Rome] 12: 17-18, Jan., 1921, under title: Effect of Temperature upon the Polar and Altitude Limits of Tree Growth.

KÖVESSI, F. (1102)

SUR LA PROPORTION DE L'EAU COMPARÉE À L'AOUÏTEMENT DES VÉGÉTAUX LIGNEUX. Compt. Rend. Acad. Sci. [Paris] 132: 1359-1361. June 3, 1901.

The author shows that the maturing of the branches and an abundant flowering and fruitage are in inverse proportion to the amount of water received by the fruit tree.

KOLISKO, FRAU LILLY (NOHA). (1103)

PHYSIOLOGISCHER NACHWEIS DER WIRKSAMKEIT KLEINSTER ENTITÄTEN BEI 7 METALLEN. WIRKUNG VON LICHT UND FINSTERNIS AUF DAS PFLANZENWACHSTUM. EXPERIMENTELLE ARBEIT AUS DEM BIOLOGISCHEN INSTITUTE AM GOETHEANUM. 165 p. Dornach (Schweiz) Philosophisch-anthroposophischer Verlag am Goetheanum, 1926.

Includes study of the effect of light and darkness on plant growth.

KOLKUNOV, VLADIMIR V. (1104)

[CONCERNING THE QUESTION OF CREATING A RACE OF CULTIVATED PLANTS CAPABLE OF ENDURING DROUGHTS.] 74 p. Kiev, 1905.

(1105)

EINIGE ERGEBNISSE DER UNTERSUCHUNGEN ÜBER DÜRREWIDERSTANDSFÄHIGKEIT BEI KULTURPFLANZEN. Ztschr. Pflanzenzücht. 10: 297-310. Aug., 1925.

A study of drought resistance in cultivated plants.

- KOLKUNOV, VLADIMIR V.—Continued. (1106)
 [INQUIRY INTO TRANSPIRATION AND DROUGHT RESISTANCE IN CULTIVATED PLANTS.] Jour. Landw. Wiss. 3: 531-551. 1916.
 In Russian.
- (1107)
 ON THE SELECTION OF A TYPE OF WHEAT RESISTANT TO SEVERE WINTERS. Khosiaistvo 7: 1161-1167. Sept. 13, 1912.
 In Russian. Not examined.
 Abstract in Internatl. Inst. Agr. [Rome], Bur. Agr. Intell. and Plant Diseases Bul. 3: 2631-2634. Dec., 1912.
 The effect of low temperatures and of a covering of ice or snow on wheat is discussed.
- KOLMODIN, GUSTAF. (1108)
 TILLVÄXTUNDERSÖKNINGAR I NORRA DALARNA. Skogsvårdsför. Tidskr. h. 1-2. 1923.
 Abstract by Axel Wallén. L'Accroissement des Conifères et la Température, in Geografiska Ann. 6: 99-100. 1924.
 The author discusses the effect of temperature on the growth of the pine tree.
- KOL'TSOV, L. (1109)
 [INFLUENCE OF THE LENGTH OF DAYLIGHT PERIOD ON SIZE AND GROWTH OF PLANTS.] Gosudarstvennyi Inst. Opytn. Agron. (Ann. State Inst. Expt. Agron.) (4): 139-142. 1923.
 In Russian.
- KOMMERELL, ELISABETH (1110)
 QUANTITATIVE VERSUCHE ÜBER DEN EINFLUSS DES LICHTES VERSCHIEDENER WELLENLÄNGEN AUF DIE KEIMUNG VON SAMEN. Jahrb. Wiss. Bot. 66: 461-512. 1927.
 Abstract in Expt. Sta. Rec. 61: 515. Oct., 1929.
 "Quantitative experimentation on light wave length as a factor influencing germination in seeds of *Lythrum salicaria* and *Nicotiana tabacum* is detailed as to method, results, and indications. The yield in plantlets produced is said to have been within limits directly proportional to wave length."
- KONINGSBERGER, V. J. (1111)
 LICHTINTENSITÄT UND LICHTEMPFINDLICHKEIT. Rec. Trav. Bot. Néerland. 20: 257-312. 1923.
 The factor of intensity of light and its effect upon plant growth is studied.
- KONSTANTINOV, P. N. (1112)
 CONCERNING TRANSPIRATION IN PLANTS AND THEIR ABILITY TO WITHSTAND DROUGHT. Jour. Landw. Wiss. 2: 405-414. 1925.
 In Russian.
- KORFF, GUSTAV, and WEIGERT, J. (1113)
 EINFLUSS DER WITTERUNG AUF DIE ENTWICKLUNG UND DEN GESUNDHEITZUSTAND DER LANDWIRTSCHAFTLICHEN KULTURPFLANZEN IM JAHRE 1926. Prakt. Bl. Bayer. Landesanst. Pflanzenbau u. Schutz 4(5): 103-111. Aug., 1926.
 A discussion of the effect of the weather of 1926 in Bavaria on grain and fodder crops and potatoes.
- KORSTIAN, CLARENCE F. (1114)
 CONTROL OF SNOW MOLDING IN CONIFEROUS NURSERY STOCK. Jour. Agr. Research 24: 741-748. June 2, 1923.
 A brief account of injury to conifers from snow-molding fungi.
- (1115)
 EFFECT OF A LATE SPRING FROST UPON FOREST VEGETATION IN THE WASATCH MOUNTAINS OF UTAH. Ecology 2: 47-52. Jan., 1921.
 The results of a late spring frost upon forest trees are noted. "Practically all of the herbaceous vegetation was frozen to the ground. The perennial plants sprouted up again but with a less luxuriant growth containing less nutriment. The killing frost, followed by a dry period during the early summer, resulted in a material decrease in the amount of forage produced on the forest ranges and also caused it to dry up earlier than usual."

- KORSTIAN, CLARENCE F.—Continued. (1116)
 FACTORS CONTROLLING GERMINATION AND EARLY SURVIVAL IN OAKS. Yale Univ. School Forestry Bul. 19, 115 p. 1927.
 Rev. Ecology 9: 104-106; Jan., 1928; Bot. Gaz. 85: 467-468. June, 1928.
 Among the factors studied are temperature and moisture conditions.
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- SOME ECOLOGICAL EFFECTS OF SHADING CONIFEROUS NURSERY STOCK. Ecology 6: 48-51. Jan., 1925. (1117)
- KOSTYCHEV, SERGIEL. (1118)
 ÉTUDES SUR LA PHOTOSYNTHESE I-III. Russ. Bot. Obshch. (Jour. Soc. Bot. Russie) 5: 50-71. 1920.
 In Russian, with French résumés.
 A study of photosynthesis.
- KOTILA, J. E. (1119)
 FROST INJURY OF POTATO TUBERS. Mich. Acad. Sci. Ann. Rpt. 20: 451-460. 1918.
- KOTOWSKI, FELIX. (1120)
 TEMPERATURE ALTERNATION AND GERMINATION OF VEGETABLE SEED. Acta Soc. Bot. Poloniae 5: 71-78. 1927.
 The influence on eight species of vegetables of six kinds of alternations of temperature is studied.
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- TEMPERATURE RELATIONS TO GERMINATION OF VEGETABLE SEED. Amer. Soc. Hort. Sci. Proc. 1926: 176-184. (1121)
 Experiments made with 17 species of vegetables, belonging to eight families showed that "speed of germination increases as the temperature rises, for all species. However, spinach, lettuce, cabbage, parsley and beets gave higher percentage germination at the lower temperatures employed."
- KRAPIVINE, VERA. (1122)
 A CONTRIBUTION ON THE SIGNIFICANCE OF PHOTOPERIODS WITH NICOTIANA TABACUM. Detskoseľ'skaĭ Akklimatizatsionnaĭ Sta. (Labours Acclim. Sta.) no. 7, p. 188-198. 1928.
 In Russian, with English abstract. Abstract in Expt. Sta. Rec. 62: 320. Mar., 1930.
- KRAYBILL, H. R. (1123)
 EFFECTS OF SHADING SOME HORTICULTURAL PLANTS. Amer. Soc. Hort. Sci. Proc. 1922: 9-17.
 The shading of apple and peach trees reduced the fruit bud formation.
- KRISHNAMURTHI, RAO, K. (1124)
 FACTORS INFLUENCING THE GROWTH AND SUGAR CONTENTS OF CANE. Agr. Jour. India 24: 91-101. Mar., 1929.
 Appeared also in abridged form in Facts about Sugar 24: 690-691. July 20, 1929. Reprinted in So. African Sugar Jour. 13: 761-763. Nov. 30, 1929.
 Contains a brief discussion of the temperature and water conditions favorable to cane growth. "Countries which enjoy a long humid and warm season during the period of growth with an average mean temperature of 75° F. (average of 68° and 88° F.) and a fairly dry cold season with an average mean temperature of 59° F. (average of 65° and 52° F.) appear best suited for cane distribution."
- KROLL, GÜNTHER H. (1125)
 WIND UND PFLANZENWELT. EINE STUDIE. Bot. Centbl., Beihefte (Abt. 1) 30: 122-140. 1913.
 The direct and indirect effect of wind on plant life is discussed.
- KRÜGER, E. (1126)
 NIEDERSCHLAGS-UND ERNTEMENGE. Deut. Landw. Presse 42: 420-421. June 12, 1915.
 An attempt is made to correlate summer and winter rainfall with the yields of summer and winter wheat, rye, oats, barley, beets, and potatoes. The conclusion is drawn that winter rainfall exerts no apparent influence upon the yield of any of the crops, whereas summer rainfall increases the production, though not to an exceptional extent.

- KUIJPER, J. (1127)
 ÜBER DEN EINFLUSS DER TEMPERATUR AUF DIE ATMUNG DER HÖHEREN PFLANZEN.
 Rec. Trav. Bot. Néerland. 7: 131-240. 1910.
 Abstract in Expt. Sta. Rec. 24: 533. May, 1911.
 "The author has investigated the influence of temperature on the respiration of some of the higher plants in order to test the theory of Blackman and Matthaei regarding the limiting factors of respiration. (cf. E. S. R. 17: 234.) The experiments were made with pea, wheat, and lupine seedlings . . . In general, the limiting factor of temperature was found to hold good, as described by Blackman, but some fluctuations were noted."
- KULKARNI, G. S. (1128)
 CONDITIONS INFLUENCING THE DISTRIBUTION OF GRAIN SMUT (SPHACELOTHECA SORGHI) OF JOWAR (SORGHUM) IN INDIA. Agr. Jour. India 17: 159-162. Mar., 1922.
 Experiments are described which show that "temperature is the controlling factor in the distribution of the grain smut in India."
- KUNKELE. (1129)
 HANGRICHTUNG (EXPOSITION) UND PFLANZENKLIMA. Forstw. Centbl. 47: 597-606. Aug. 15, 1925.
 The effect of slope exposure on plant growth is discussed.
- KUSANO, SHUNSUKE. (1130)
 TRANSPIRATION OF EVERGREEN TREES IN WINTER. Jour. Col. Sci., Imp. Univ. Tokyo 15: 313-366. Aug. 30, 1901.
 A study of the causes of the transpiration of evergreen trees in winter in Japan.
- KUZNETSOV, E. S. (1131)
 TRANSPIRATION STUDIES. Zhur. Opytn. Agron. (Ingo-Vostoka (Jour. Expt. Landw. Südost. Eur.-Russlands) 3: 154-170. 1927.
 In Russian, with German abstract.
 Abstract in Expt. Sta. Rec. 63: 20. July, 1930.
 Not seen.
 "It is thought that the influences of meteorological factors may explain certain anomalous variations in transpiration."
- LACODRE, R. (1132)
 NOTE SUR LA RÉSISTANCE DES BLÉS À L'HIVER EN BRIE. Jour. Agr. Prat. 49: 511-513. June, 1928.
 Not seen.
- LÄMMERMAYER, LUDWIG. (1133)
 DIE ANPASSUNG DER PFLANZE AN DIE BELEUCHTUNG. Mitt. Naturw. Ver. Steiermark 52: 333-353. 1915.
 The effect of light on plants is discussed.
- _____. (1134)
 UNTERSUCHUNGEN ÜBER DIE LICHTKLIMATISCHEN VERHÄLTNISSE IM GEBIETE DES ZIRBITZKOGELS UND ÜBER DEN LICHTGENUSS DER ZIRBE. Österr. Bot. Ztschr. 74 (1-3): 15-26. Jan.-Mar., 1925.
 A study of the effect of light on a variety of pine tree.
- LAKON, GEORG. (1135)
 DIE FRAGE DER JÄHRLICHEN PERIODIZITÄT DER PFLANZEN IM LICHT DER NEUESTEN FORSCHUNG. Naturw. Ztschr. Forst-u. Landw. 13: 85-103. Feb.-Mar., 1915.
 A study of plant periodicity.
- _____. (1136)
 NEUERE BEITRÄGE ZUR FRAGE DER JÄHRLICHEN PERIODIZITÄT DER PFLANZEN, INSBESONDERE DER HOLZGEWÄCHSE. Naturw. Ztschr. Forst-u. Landw. 11: 28-48. Jan., 1913.
 Periodicity of woody plants.
- _____. (1137)
 ÜBER DIE JÄHRLICHE PERIODIZITÄT PANACHIEFTER HOLZGEWÄCHSE. Ber. Deut. Bot. Gesell. 34: 639-648. Nov., 1916.
 Periodicity of woody plants and the effect on it of external conditions.
- LAMBERG, GERHARD. (1138)
 DAS LICHT ALS WACHSTUMSFAKTOR. Bot. Arch. 2: 213-228. Nov. 15, 1922.
 Light as a factor in the growth of some cereals.

- LAMBERG, GERHARD, and MITSCHERLICH, E. A. (1139)
 ÜBER DAS LICHT ALS WACHSTUMSFAKTOR. Ztschr. Pflanzenernähr. u. Düngung
 1: 291-298. 1922. A. Wiss. Teil.
 The authors discuss light as a factor of plant growth.
- LAMBERT, EDMUND B. (1140)
 THE RELATION OF WEATHER TO THE DEVELOPMENT OF STEM RUST IN THE MISSISSIPPI VALLEY. Phytopathology 19: 1-71. Jan., 1929.
 "The weather affects the development of all phases in the life cycle of the stem rust organism."
- LAMPE, LOIS. (1141)
 EFFECT OF TEMPERATURE AND LIGHT UPON THE DEVELOPMENT OF CORN ENDOSPERM. Amer. Jour. Bot. 15: 632. Dec., 1928, Sup.
 Abstract of a paper presented before the physiological section of the Botanical Society of America, New York, N. Y., Dec. 27-29, 1928.
- LANGE, SIEGFRIED. (1142)
 ÜBER DEN EINFLUSS WEISSEN UND ROTEN LICHTES AUF DIE ENTWICKLUNG DES MESOKOTYLS BEI HAFERKEIMLINGEN. Jahrb. Wiss. Bot. 71: 1-25. June, 1929.
 One of the effects of red and white light on oat seedlings is discussed. (1143)
- DIE VERTEILUNG DER LICHTEMPFINDLICHKEIT IN DER SPITZE DER HAFERKOLEOPTILE. Jahrb. Wiss. Bot. 67: 1-51. 1927.
 The sensitiveness to light of the oat coleoptile is studied.
- LANGLET, OLAF. (1144)
 EINIGE EIGENTÜMLICHE SCHÄDIGUNGEN AN KIEFERNWALD NEBST EINEM VERSUCH, IHRE ENTSTEHUNG ZU ERKLÄREN. Ztschr. Pflanzenkrank. u. Schutz 40: 261-265. May, 1930.
 A discussion of frost damage to pine trees.
- LARBAUD, MARGUERITE. (1145)
 MODIFICATIONS CAUSÉES PAR LE CLIMAT ALPIN DANS LA MORPHOLOGIE ET L'ANATOMIE FLORALES. Ann. Sci. Nat. Bot. (10) 5: 193-310. Dec., 1923.
 A study of the influence of altitude on the blooming period, the morphology, and the anatomy of plants.
- LAROSE, ÉMILE, and VERPLANCKE, G. (1146)
 OBSERVATIONS SUR LES DOMMAGES CAUSÉS PAR LES FROIDS DE L'HIVER 1928-1929 AUX PLANTES DES JARDINS ET DES CULTURES DE L'INSTITUT AGRONOMIQUE DE GEMBLoux. Ann. Gembloux 36: 93-120. Mar., 1930.
 Observations on damage to plants caused by the cold winter of 1928-29 in Belgium.
- LARSEN, J. A. (1147)
 FOREST TYPES OF THE NORTHERN ROCKY MOUNTAINS AND THEIR CLIMATIC CONTROLS. Ecology 11(4): 631-672. 1930.
 "The occurrence of climax or permanent forest types is mainly in altitudinal belts or zonations which are determined chiefly by air temperature and precipitation . . . The types at lower altitudes require relatively large amounts of heat and little moisture, and those of high elevations little heat and relatively large quantities of moisture . . . The grasslands exhibit a wide range of temperature requirement from 39° to 50° F. These grasslands occur wherever the annual precipitation is insufficient for tree growth. For most sections 17 inches a year or less result in grassland, regardless of air temperature." The temperature and rainfall requirements are given for the various types. "Forest types of high elevations show much greater snowfall, greater depth of snow, and longer duration of snow cover than the lower types." (1147a)
- RELATION OF LEAF STRUCTURE OF CONIFERS TO LIGHT AND MOISTURE. Ecology 8: 371-377. July, 1927.
 "From the standpoint of moisture requirement, the moisture available to a species apparently determines, to some extent, its tolerance of shade. The influence of solar energy and available moisture seem, therefore, to be to a certain extent interdependent. The heat rays of strong sunshine are conducive to increased transpiration from a leaf, while shade makes no such demands on the water content."

- LASAREFF, P. (1148)
 ÜBER DIE ABSORPTION DES LICHTES DURCH DIE BLÄTTER DER PFLANZEN UND DIE
 ABSORPTION VON CHLOROPHYLLLÖSUNGEN. Biochem. Ztschr. 182: 131-133.
 Feb. 25, 1927.
 The reaction of green leaves to light is discussed.
- LASCHKE, W. (1149)
 EINIGE VERGLEICHENDE UNTERSUCHUNGEN ÜBER DEN EINFLUSS DES KEIM-
 BETTES, SOWIE DES LICHTES AUF DIE KEIMUNG VERSCHIEDENER SÄMEREIEN.
 Landw. Vers. Sta. 65: 295-300. 1907.
 A brief discussion of the influence of light on seed germination.
- LATITUDE, ALTITUDE, AND HARDINESS. Gard. Chron. (3) 87: 219. Mar. 22, 1930.
 (1150)
 "Our knowledge of hardiness in plants is still empirical . . . The
 relative humidity of the atmosphere at any given time is . . . the most
 critical single factor in plant life as our experience with high alpine and
 desert plants emphatically suggests."
- LAUBERT, RICHARD. (1151)
 UNGEWÖHNLICHE FLECKE AN ÄPFELN UND BIRNEN. Deut. Obstbau Ztg. 65:
 255-256. Nov. 1, 1919.
 The influence of excessive heat of the sun on apples and pears is dis-
 cussed.
- LAURENT, ÉMILE. (1152)
 SUR LE POUVOIR GERMINATIF DES GRAINES EXPOSÉES À LA LUMIÈRE SOLAIRE.
 Compt. Rend. Acad. Sci. [Paris] 134: 1295-1298. Dec. 29, 1902.
 The author describes experiments which show the harmful effect of
 sunlight on seeds.
- LAURITZEN, J. I. (1153)
 THE RELATION OF TEMPERATURE AND HUMIDITY TO INFECTION BY CERTAIN
 FUNGI. Phytopathology 9: 7-35. Jan., 1919.
- and HARTER, L. L. (1154)
 THE RELATION OF HUMIDITY TO INFECTION OF THE SWEET POTATO BY RHIZOPUS.
 Jour. Agr. Research 33: 527-539. Sept. 15, 1926.
- LAWRENCE, A. O. (1155)
 SUSCEPTIBILITY OF EUCALYPTS TO DROUGHT. Aust. Forestry Jour. 6: 133-134.
 May, 1923.
- LAZARENKO, A. (1156)
 DEPENDENCE OF YIELDS ON THE CHIEF METEOROLOGICAL FACTORS. Viestnik
 Russ. Selsk. Khoz. (Bul. Russ. Rural Econ.), no. 24-28. 1908.
 In Russian.
 "From meteorological data and records of the yields during the years
 1893 to 1902 on an estate in the Government of Kharkov, the author
 draws the following conclusions: The yields of both winter and summer
 cereals depend directly on the amount of precipitation during the entire
 period of growth and inversely on the sum of temperatures. Millet
 seemed to be an exception. The gross yield of beets depended directly
 upon the precipitation and inversely upon the sums of temperature dur-
 ing the entire growing period (April seemed to be an exception—a higher
 temperature during that month appearing to be favorable for the growth
 of beets); while the quality of the yield was inversely as the cloudiness
 during July, August, and September." Expt. Sta. Rec. 21: 526. Nov.,
 1909.
- LEACH, JULIAN G. (1157)
 THE RELATION OF INSECTS AND WEATHER TO THE DEVELOPMENT OF HEART ROT
 OF CELERY. Phytopathology 17: 663-667. Sept., 1927.
 "Destructive outbreaks of heart rot occur only in hot dry weather and
 are usually most destructive on the drier bogs. Even after the disease
 has become prevalent throughout a field, a period of rainy weather will
 apparently check its development completely."
- LEAKE, H. MARTIN. (1158)
 THE AGRICULTURAL VALUE OF RAINFALL IN THE TROPICS. Roy. Soc. [London]
 Proc., Ser. B, 103: 82-96. June 1, 1928.
 Reprinted in Emp. Cotton Growing Rev. 5: 212-227. July, 1928; and
 in Agr. Jour. India 24: 264-276. July, 1929.

LEAKE, H. MARTIN—Continued.

"The 'effective rainfall' is a daily measure of the soil moisture which originates in rain and is available for plant growth." Under certain conditions "the effective rainfall becomes a means of estimating crop yields, and an analysis has been made, in the case of the cane crop, of an estate in Barbados and, in the case of the cotton crop, of the Dhulla Farm, Bombay Presidency."

LEBEDEV, A. D., and EVERT, A. F.

(1159)

GEOGRAPHICAL DISTRIBUTION OF THE FLAX GROWING DISTRICTS IN U. S. S. R., ACCORDING TO QUALITY OF FIBER, WITH REFERENCE TO TEMPERATURE AND RAINFALL DURING THE GROWING PERIOD. *Trudy Prikl. Bot. i Selekt. (Bul. Appl. Bot. and Plant Breeding.)* 18: 371-396. 1927.

In Russian.

Abstract in *Biol. Abs.* 3: 852. Apr.-June, 1929.

"Within the limits of every region, rainfall and temperature influence the quality of the fiber approximately in the same degree." Author's summary.

LEBEDINCEV, ELISABETH.

(1160)

PHYSIOLOGISCHE UND ANATOMISCHE BESONDERHEITEN DER IN TROCKENER UND IN FEUCHTER LUFT GEZOGENEN PFLANZEN. *Ber. Deut. Bot. Gesell.* 45: 83-96. Mar. 24, 1927.

A study of the effect of atmospheric moisture on the physiological and anatomical composition of plants.

(1161)

A STUDY OF WATER-RETAINING CAPACITY IN RELATION TO DROUGHT AND FROST RESISTANCE. *Trudy Prikl. Bot. i Selekt. (Bul. Appl. Bot. and Plant Breeding.)* 23 (2): 1-30. 1930.

In Russian with English summary.

LE CLERC, J. A.

(1162)

THE EFFECT OF CLIMATIC CONDITIONS ON THE COMPOSITION OF DURUM WHEAT. U. S. Dept. Agr. Yearbook 1906: 199-212. 1907.

The effect of temperature and rainfall is briefly noted.

— and BREAZEALE, J. F.

(1163)

PLANT FOOD REMOVED FROM GROWING PLANTS BY RAIN OR DEW. U. S. Dept. Agr. Yearbook 1908: 389-402. 1909.

"The analyses of plants for ash ingredients may give misleading results when it is desired to determine the amount of plant food absorbed by or essential to plant growth, unless the leaching action of rain and dew as herein demonstrated be considered."

— and YODER, P. A.

(1164)

ENVIRONMENTAL INFLUENCES ON THE PHYSICAL AND CHEMICAL CHARACTERISTICS OF WHEAT. *Jour. Agr. Research* 1: 275-291. Jan. 10, 1914.

Experiments are described which show that climatic factors, such as rainfall, sunshine, humidity, temperature, and winds, have a strong determining influence upon the physical and chemical properties of wheat.

LEES, A. H.

(1165)

INFLUENCE OF SUMMER RAINFALL AND PREVIOUS CROP ON FRUITING OF APPLES. *Jour. Pomol. and Hort. Sci.* 5: 178-194. July, 1926.

The author shows that late summer growth, which is the result of excessive rainfall, is parasitic on the food supply that normally should be laid down as a reserve for the buds. He concludes that high summer rainfall affects adversely the ensuing crop, but only when taken in conjunction with a heavy crop is the effect disastrous.

LEHENBAUER, PHILIP AUGUSTUS.

(1166)

GROWTH OF MAIZE SEEDLINGS IN RELATION TO TEMPERATURE. *Physiol. Researches* 1 (Ser. 5): 247-288. Dec. 1914.

A detailed experimental study.

LEHMANN, ERNST.

(1167)

LICHTKEIMUNGSFRAGEN. *Ztschr. Bot.* 7: 560-580. 1915.

Contains a critical review of recent literature on the relation of light to germination.

(1168)

TEMPERATUR UND TEMPERATURWECHSEL IN IHRER WIRKUNG AUF DIE KEIMUNG LICHTEMPFLINDLICHER SAMEN. *Ber. Deut. Bot. Gesell.* 29: 577-589. 1911.

The author discusses the effect of changes of temperature upon the germination of seeds sensitive to light.

- LEHMANN, ERNST—Continued. (1169)
 ÜBER DIE BEEINFLUSSUNG DER KEIMUNG LICHTEMPFLINDLICHER SAMEN DURCH DIE TEMPERATUR. Ztschr. Bot. 4: 465-529. 1912.
 The author discusses the effect of temperature on the germination of seeds sensitive to light.
- and OTTENWÄLDER, A. (1170)
 ÜBER KATALYTISCHE WIRKUNG DES LICHTES BEI DER KEIMUNG LICHTEMPFLINDLICHER SAMEN. Ztschr. Bot. 5: 337-364. 1913.
 A study of the effect of light on seed germination. The temperature range of germinability in light is found to be greater than that in darkness.
- LEHMANN, PAUL. (1171)
 ZUM PROBLEM DES WINDSCHUTZES IN DER LANDWIRTSCHAFT. Fortschr. Landw. 1: 493-501. Aug. 15, 1926.
 The effect of wind on crops and the advantages of windbreaks are discussed.
- LEIGHTY, CLYDE EVERT, and SANDO, W. J. (1172)
 THE BLOOMING OF WHEAT FLOWERS. Jour. Agr. Research 27: 231-244. Feb. 2, 1924.
 The influence of temperature, rainfall, and sunshine on the blooming of wheat flowers is considered.
- and others. (1173)
 THE CORN CROP. U. S. Dept. Agr. Yearbook 1921: 161-226. 1922.
 The influence of rainfall on corn yield is briefly indicated. The relation of rainfall to corn yield for the years 1888-1921 in Indiana, Illinois, Iowa, and Missouri is shown.
- LEITCH, ISABELLA. (1174)
 SOME EXPERIMENTS ON THE INFLUENCE OF TEMPERATURE ON THE RATE OF GROWTH IN PISUM SATIVUM. Univ. Aberdeen Studies 96: 69-90. 1925. (Botanical Studies, first series, by Macgregor Skene and others.)
- (1175)
 SOME EXPERIMENTS ON THE INFLUENCE OF TEMPERATURE ON THE RATE OF GROWTH IN PISUM SATIVUM. Ann. Bot. [London] 30: 25-46. Jan., 1916.
 Experiments with peas are described which show that there is a well-marked optimum temperature for growth.
- LELAND STANFORD JUNIOR UNIVERSITY. FOOD RESEARCH INSTITUTE. (1176)
 FORECASTING WHEAT YIELDS FROM THE WEATHER. 44 p. Stanford University, Calif., 1928. (Its Wheat Studies, v. 5, no. 1, Nov., 1928.)
 "This issue is the work of Carl L. Alsberg, with the assistance of E. P. Griffing."
 "The purpose of the present paper is to bring together what is known concerning the forecasting of yields of wheat from the weather and to present as simple and as lucid a picture as possible of the status of existing knowledge of this problem. This demands in the first place consideration of weather as an environmental factor, consideration of the biology of the wheat plant as the basis of its reaction to the weather, consideration of the methods used in forecasting yields from the weather, and finally a discussion of how these methods have been applied to wheat. Incidentally, reference is made to other crop plants when data on any particular point are lacking for the wheat plant . . . For present purposes weather may be resolved into three factors—light, heat, and moisture."
- LEMOKE, ALFRED. (1177)
 BERICHT ÜBER DIE FROSTSCHÄDEN UND DIE AUSWINTERUNG VON WINTERGETREIDE UND KLEE IN DER PROVINZ OSTPREUSSEN IM WINTER 1906-7. Landw. Arb. East Prussia, no. 20, p. 15-66. 1908.
 A study of frost damage to grain and clover in East Prussia during the severe winter of 1906-7.
- LENGTH OF DAY AND BLOSSOM TIME. Gard. Chron. (3) 68: 115, 127. Sept., 1920. (1178)
 A discussion of the findings of Garner and Allard on the subject. The second article is quoted verbatim in Gard. Chron. Amer. 24: 378. Nov., 1920.

- LEONARD, LEWIS T. (1179)
EFFECT OF MOISTURE ON A SEED-BORNE BEAN DISEASE. Jour. Agr. Research 28: 489-497. May 3, 1924.
The effect of rainfall and temperature on bean wilt is briefly discussed.
- LEONE, G. (1179a)
LA DIFESA DAL VENTO NELLA BONIFICA AGRARIA DELLE STEPPE TRIPOLITANE. Agr. Colon. 24: 155-184. Apr., 1930.
Abstract in Ann. Tec. Agr. 3: 445-448. Oct. 1, 1930.
Suggested methods of protection against the winds which are injurious to the vegetation of Tripoli.
- LEPESCHKIN, W. W. (1180)
ZUR KENNTNIS DER EINWIRKUNG SUPRAMAXIMALER TEMPERATUREN AUF DIE PFLANZE. Ber. Deut. Bot. Gesell. 30: 703-714. 1912.
The author shows that the death of active plant cells by supramaximal temperatures is due to coagulation of the cell protoplasm.
- LEPKE. (1181)
DIE WIRKUNG DES WINDES AUF BÄUME. Umschau 32: 877-878. Oct. 20, 1928.
The effect of wind on trees is noted and illustrated.
- LEPPAN, H. D. (1182)
RAINFALL IN RELATION TO AGRICULTURE IN THE TRANSVAAL. Transvaal Univ. Col. Bul. 12, p. 47-63. Sept., 1927.
"The rainfall of the Transvaal is disappointing in its effectiveness for agricultural operations. This low efficiency is chiefly accounted for by the unreliability of the rainfall; the high intensity; the high coefficient of evaporation; the high transpiration ratio of plants; the marked seasonal distribution of the rainfall; and often the poor distribution within the growing season."
- LESAGE, PIERRE. (1183)
INFLUENCE DE LA CHALEUR SUR L'ÉNERGIE POTENTIELLE DES PLANTES. Compt. Rend. Acad. Sci. [Paris.] 185: 1606-1608. Dec. 27, 1927.
It is found that in the case of *Lepidium sativum*, the speed of growth increases with the temperature and the length of the vegetative period diminishes.
- LESS, E. (1184)
ÜBER BEZIEHUNGEN ZWISCHEN DER WITTERUNG UND DEN ERNTEERTRÄGEN IN PREUSSEN. Ztschr. Pflanzenernähr., Düngung u. Bodenk. 6: 490-496. Nov., 1927.
The influence of weather conditions, particularly of rainfall, temperature, and sunshine on crop yield in Prussia is studied for the period 1899 to 1913.
- (1185)
ÜBER DIE ABHÄNGIGKEIT DER ERNTEERTRÄGE IN PREUSSEN VON NIEDERSCHLÄGEN UND TEMPERATURE. Landw. Jahrb. 64: 241-296. 1926.
Abstract in Expt. Sta. Rec. 56: 413. Apr., 1927.
"The relation of yield of wheat, rye, barley, oats, potatoes, clover, alfalfa, and meadow hay to precipitation and temperature in different parts of Prussia during the 15 years 1899-1913, indicate that under the usual climatic conditions prevailing in Prussia the yield of these crops is more obviously dependent upon precipitation than upon temperature during the growing season as well as preceding it."
- LEVINE, M. N. (1186)
BIOMETRICAL STUDIES ON THE VARIATION OF PHYSIOLOGIC FORMS OF PUCCINIA GRAMINIS TRITICI AND THE EFFECTS OF ECOLOGICAL FACTORS ON THE SUSCEPTIBILITY OF WHEAT VARIETIES. Phytopathology 18: 7-123. 1928.
In experiments with 19 different physiologic forms of *Puccinia graminis tritici* a positive correlation was observed between the average temperature and total rainfall during the last two months of the growing season and the severity of stem-rust infection on susceptible varieties of wheat.
- LI, TSI-TUNG. (1187)
EFFECT OF CLIMATIC FACTORS ON SUCTION FORCE. Quart. Rev. Biol. 4: 401-414. Sept., 1929.
Four climatic factors, air temperature, relative humidity, sunlight intensity, and evaporation, are observed in their effect on the suction force of the leaf of *Syringa oblata*.

- LI, TSI-TUNG—Continued. (1188)
 THE EFFECT OF INTENSE SUNLIGHT ON TREE SEEDLINGS. Lingnan Sci. Jour.
 6: 315-321. Dec., 1928.
-
- THE IMMEDIATE EFFECT OF CHANGE OF LIGHT ON THE RATE OF PHOTOSYNTHESIS.
 Ann. Bot. [London] 43: 587-601. July, 1929.
 "An initial inhibition effect on photosynthetic rate is observed when
 the plant is changed from the light of high available energy for photo-
 synthesis to low available energy. An initial acceleration effect is ob-
 served when the plant is shifted from the light of low available energy
 to that of high available energy."
- LIDFORSS, B. (1190)
 DIE WINTERGRÜNE FLORA. Lunds Univ. Arsskr. (N. F.) Afd. 2, Bd. 2, no. 13.
 76 p. 1907.
 The author develops the theory of the protective action of sugar to
 explain the fact that many plants in Sweden maintain their green
 leaves during the winter.
- LIEBENBERG, A. RITTER VON. (1191)
 UEBER DEN EINFLUSS INTERMITTIRENDER ERWÄRMUNG AUF DIE KEIMUNG VON
 SAMEN. Bot. Centbl. 18: 21-26. 1884.
 The author found that neither diffuse light nor sunlight had any effect
 on the germination of *Poa* seeds, which was only affected by temperature
 fluctuations.
- LIGHT AND GROWTH. Nature [London] 119: 543. Apr. 9, 1927. (1192)
 A brief review of recent literature on the subject.
- LILJELUND, VICTOR. (1193)
 KOLDENS INVERKAN PÅ VÄXTERNA. Fruktträdgården 1: 18-25. 1925.
 The effect of cold on plants is discussed.
- LINDMAN, CARL AXEL MAGNUS. (1194)
 SOME CASES OF PLANTS SUPPRESSED BY OTHER PLANTS. New Phytol. 12 (1):
 1-6. Jan., 1913.
 A brief account of the effect on plants of the shade cast by other
 plants.
- LINFORD, MAURICE B. (1195)
 A FUSARIUM WILT OF PEAS IN WISCONSIN. 44 p. Madison, 1928. (Wis. Agr.
 Expt. Sta. Research Bul. 85.)
 The optimum temperature for this disease was found to be very near
 that for the growth of the healthy pea plant.
- LINK, KARL PAUL, and SCHULZ, ERNEST R. (1196)
 EFFECTS OF THE METHOD OF DESICCATION ON THE NITROGENOUS CONSTITUENTS
 OF PLANT TISSUE. Jour. Amer. Chem. Soc. 46: 2044-2050. Sept., 1924.
 Experiments with beets, corn, and barberry are described.
- LINKOLA, KAARLO. (1197)
 ZUR KENNTNIS DER ÜBERWINTERUNG DER UNKRÄUTER UND RUDERALPFLANZEN
 IN DER GEGEND VON HELSINGFORS. Suomalaisen eläin—ja kasvitieteellisen
 seuran Vanamon Julkaisuja . . . Ann. 1: 91-228. 1923.
 Cold resistance of certain plants in Finland is discussed. A com-
 parison is made with conditions in Sweden.
- LINNEY, CHARLES E. (1198)
 CLIMATE AND VEGETATION. U. S. Dept. Agr., Weather Bur. Bul. 30: 98-104.
 1901.
 Some relations between weather and crop growth are indicated.
- and GRACIA, FABIAN. (1199)
 CLIMATE IN RELATION TO CROP ADAPTATION IN NEW MEXICO. 132 p. State
 College, 1918. (N. Mex. Agr. Expt. Sta. Bul. 113.)
 Data with regard to temperature and rainfall in different parts of
 the State are given, with a brief account of the agricultural possibilities
 of each county.
- GARCIA, FABIAN, and HOLLINGER, E. C. (1199a)
 CLIMATE AS IT AFFECTS CROPS AND RANGES IN NEW MEXICO. 84 p. State
 College, 1930. (N. Mex. Agr. Expt. Sta. Bul. 182.)
- LISCES, H. (1200)
 DIE EINWIRKUNG NIEDRIGER WÄRMESGRADE AUF DIE PFLANZE. Deut. Obst. u.
 Gemüsebau Ztg. 69: 344-347. Nov. 9, 1923.
 The effect of low temperature and frost on plants is discussed.

LISINKO, T. D.

(1201)

THE INFLUENCE OF THE THERMAL FACTORS ON THE DURATION OF PHASES DURING THE DEVELOPMENT OF THE PLANT. EXPERIMENTS WITH GRAMINEOUS (GRASSY) AND COTTON PLANTS. Baku, 1928. Azerbaidjan Cent. Agr. Expt. and Plant Breeding Sta. Works, pt. III.

Not examined. Reference given as found.

The conclusions reached are given in Cotton Growing Rev. 6: 274-276, July, 1929. A distinction is made between the growth of the plants considered as a whole and the various stages through which the plants pass. "The intensity of the thermal energy is one of the chief factors which influence both the duration of the various stages in plant development, and of the entire vegetative period."

LITVINOV, NICHOLAY.

(1202)

ÜBER DEN EINFLUSS DES FROSTES AUF DIE ENTWICKLUNG DER VERSCHIEDENEN GERSTENFORMEN BEIM AUFTRETEN DER FRITTLIEGE. Bul. Angew. Bot. 4: 541-551. Nov., 1911.

In Russian, German summary p. 548-551.

LIVINGSTON, BURTON E.

(1203)

ATMOSPHERIC INFLUENCE ON EVAPORATION AND ITS DIRECT MEASUREMENT. U. S. Mo. Weather Rev. 43: 126-131. Mar., 1915.

"The present paper deals with some considerations brought forward by the study of evaporation in its biological relations, but these considerations may not be without interest to climatologists, especially to those dealing with agricultural climatology."

(1204)

CLIMATIC AREAS OF THE UNITED STATES AS RELATED TO PLANT GROWTH. Amer. Phil. Soc. Proc. 52: 257-275. April, 1913.

Contains a discussion of the effect of moisture and temperature on plant growth.

"The problems here dealt with concern the relations between certain desert plants on the one hand and their physical environment, consisting of soil and atmosphere, on the other."

(1205)

EVAPORATION AND CENTERS OF PLANT DISTRIBUTION. Plant World 11: 106-112. 1908.

A brief account of a study of the effect of evaporation on plant growth in relation to plant distribution.

(1206)

INCIPIENT DRYING AND TEMPORARY AND PERMANENT WILTING OF PLANTS, AS RELATED TO EXTERNAL AND INTERNAL CONDITIONS. Johns Hopkins Univ. Circ. 293: 176-182. Mar., 1917.

In a number of plants submitted to tests transpiration was found to be greater than water absorption. "The inadequacy was within the plant, an internal condition."

(1207)

LIGHT INTENSITY AND TRANSPIRATION. Bot. Gaz. 52: 417-438. Dec., 1911.

"The present paper deals with an attempt to find some simple means of physically determining the intensity of solar radiation with reference to its effect on plant transpiration."

(1208)

PHYSIOLOGICAL TEMPERATURE INDICES FOR THE STUDY OF PLANT GROWTH IN RELATION TO CLIMATIC CONDITIONS. Physiol. Researches 1 (Serial no. 8): 399-420. April, 1916.

"This publication deals with the derivation and use of a series of physiological indices of temperature efficiency for plant growth."

(1209)

THE RELATION OF DESERT PLANTS TO SOIL MOISTURE AND TO EVAPORATION. 78 p. Washington, D. C., Carnegie institution, 1906.

(1210)

RELATION OF TRANSPIRATION TO GROWTH IN WHEAT. Bot. Gaz. 40: 178-195. Sept., 1905.

"The method for comparison of plant growth here provisionally established for wheat is found also to hold for the grasses generally."

(1211)

A SINGLE INDEX TO REPRESENT BOTH MOISTURE AND TEMPERATURE CONDITIONS AS RELATED TO PLANTS. Physiol. Researches 1 (Serial no. 9): 421-440. May, 1916.

LIVINGSTON, BURTON E.—Continued.

"This paper suggests a method by which the moisture and temperature conditions of any locality, for any period, as they affect plants, may be expressed as a single numerical value, the index of moisture-temperature efficiency for plant growth. This index is the product of three factors, the index of rainfall, the reciprocal of the index of atmospheric evaporating power, and the physiological index of temperature efficiency."

(1212)

A STUDY OF THE RELATION BETWEEN SUMMER EVAPORATION INTENSITY AND CENTERS OF PLANT DISTRIBUTION IN THE UNITED STATES. *Plant World* 14: 205-222. Sept., 1911.

The author shows that "the summer evaporation intensity alone furnishes a climatic criterion for studying the different vegetation centers . . . at least as promising as the criterion furnished by any other meteorological element . . . The importance of the relative intensities of evaporation to ecology and agriculture are only surpassed by the present dearth of information in this connection."

— and LIVINGSTON, GRACE JOHNSON.

(1213)

TEMPERATURE COEFFICIENTS IN PLANT GEOGRAPHY AND CLIMATOLOGY. *Bot. Gaz.* 56: 349-375. Nov., 1913.

"The present paper involves some of the results of an attempt to find a rational method for interpreting climatic temperature data for phytogeographic purposes. This sort of study is somewhat simplified, in the case of plants, by the fact that the temperature of the plant body follows very closely upon that of the surroundings and that soil temperature and air temperature are, roughly speaking, somewhat closely related. Furthermore, the heat condition of plants, as approximately measured by the temperature of the surrounding air, varies only in respect to intensity and duration; qualitative fluctuations are not met with here."

— and SHREVE, FORREST.

(1214)

THE DISTRIBUTION OF VEGETATION IN THE UNITED STATES, AS RELATED TO CLIMATIC CONDITIONS. 590 p. Washington, Carnegie Institution, 1921. (Carnegie Inst., Wash., Pub. 284.)

The author discusses moisture and temperature among the environmental conditions which affect vegetation.

LLOYD, FRANCIS E.

(1215)

ENVIRONMENTAL CHANGES AND THEIR EFFECT UPON BOLL SHEDDING IN COTTON. *Ann. N. Y. Acad. Sci.* 29: 1-131. 1920.

The effect of rainfall on boll shedding is discussed.

LOCK, R. H.

(1216)

ON THE GROWTH OF GIANT BAMBOOS, WITH SPECIAL REFERENCE TO THE RELATION BETWEEN CONDITIONS OF MOISTURE AND THE RATE OF GROWTH. *Ann. Roy. Bot. Gard., Peradeniya* 2 (pt. 2): 211-266. Aug., 1904.

"The daily rate of growth is strongly affected by external factors, among which the principal are rainfall and the psychrometric condition of the air . . . The curve of growth by day follows very closely that of the percentage moisture of the air . . . Any effect of the change from night to daylight or vice versa apart from psychrometric changes was not great enough to be recognized by the methods employed."

LOCKLIN, H. D.

(1217)

THE RELATION OF SEASON OF PRUNING OUT OLD CUTHBERT RASPBERRY CANES TO AMOUNT OF WINTER INJURY. 12 p. Pullman, 1928. (*Wash. Agr. Expt. Sta. Bul.* (n. s.) 9W.)

"The controlling factors in the winter injury under western Washington conditions appear to be the mild, rainy falls, the characteristic of the Cuthbert to not terminate its season's growth until light freezes have occurred, and the abrupt drop in temperature when freezing weather does occur."

(1218)

WINTER INJURIES TO BERRIES. *Better Fruit* 24 (10): 8, 24. April, 1930.

LÖHNIS, MARIA PETRONELLA.

(1219)

ONDERZOEK NAAR HET VERBAND TUSSCHEN DE WEERSGESTELDHEID EN DE AARDAPPELZIEKTE (PHYTOPHTHORA INFESTANS) EN NAAR DE EIGENSCHAPPEN, DIE DE VATBAARHEID DER KNOLLEN VOOR DEZE ZIEKTE BEPALEN. 129 p. [Scheveningen, 1924.] With a summary in English.

LÖHNIS, MARIA PETRONELLA—Continued.

"An investigation on the relation between the weather conditions and the occurrence of potato blight (*Phytophthora infestans*); and on the qualities that determine the degree of susceptibility of the tubers for this disease."

LOEHWING, W. F. (1220)

EFFECTS OF INSOLATION AND SOIL CHARACTERISTICS ON TISSUE FLUID REACTION IN WHEAT. *Plant Physiol.* 5: 293-305. July, 1930.

Not seen.

LÖSCHNIG, JOSEF. (1221)

FROSTSCHÄDEN UND FROSTSCHUTZ IN DER LANDWIRTSCHAFT MIT BESONDERER BERÜCKSICHTIGUNG DES WEINBAUES. 79 p. Wien, Scholle-Verlag Buchhandlungs-Gesellschaft. 1928.

Frost damage to plants, with particular reference to vines.

LOISEAU, LÉON. (1222)

INFLUENCE DE L'ALTITUDE ET DU CLIMAT SUR LES CULTURES FRUITIÈRES EN PAYS DE MONTAGNES ET COMMENT ON POURRAIT LES DÉVELOPPER. *Compt. Rend. Acad. Agr. France* 9: 886-894. Dec. 5, 1923.

Methods are outlined of adapting fruit trees to weather conditions especially in mountainous regions.

LOISEL. (1223)

INFLUENCE DE LA TEMPÉRATURE SUR LES PHÉNOMÈNES DE LA VÉGÉTATION. *Bul. Mens. Off. Renseig. Agr. [France]* 9: 1267-1272. Nov., 1910.

This paper, which records studies of the effect of light and temperature on plants, is contained in the *Rapport sur les Travaux de la Station de Climatologie Agricole de Juvisy pendant l'Année 1909*, by the director, M. Camille Flammarion.

LONGEST DROUTH AND VEGETABLE PRODUCTION. *Market Growers Jour.* 47: 587. Sept. 1, 1930. (1224)

Some of the effects of the drouth of 1930 are indicated.

LOSCH, HERMANN. (1225)

EINE BEOBSACHTUNG ÜBER APFELMEHLTAUBEFALL UND SEINE BEZIEHUNG ZUR ÖRTLICHEN LAGE. *Ztschr. Pflanzenkrank.* 31 (Hft. 1-2): 22-24. 1921.

The author finds that heat and dryness encourage apple mildew.

LOTT, R. V. (1226)

CORRELATION OF CHEMICAL COMPOSITION WITH HARDINESS IN BRAMBLES. 22 p. Columbia, 1926. (*Missouri Agr. Expt. Sta. Research Bul.* 95.)

Cold resistance in blackberry and raspberry plants is studied.

LOVE, HARRY H., and LEIGHTY, C. E. (1227)

VARIATION AND CORRELATION OF OATS (*AVENA SATIVA*). STUDIES SHOWING THE EFFECT OF SEASONAL CHANGES ON BIOMETRICAL CONSTANTS. 70 p. Ithaca, 1914. (*N. Y. Cornell Agr. Expt. Sta. Mem.* 13.)

LOVELAND, G. A. (1228)

THE INFLUENCE OF CLIMATE ON WHEAT PRODUCTION IN NEBRASKA. *Amer. Met. Soc. Bul.* 5 (3): 43-44. Mar., 1924.

This is the author's abstract of a paper presented at the Cincinnati meeting of the American Meteorological Society in December, 1923. "A complete correlation of the growth of wheat during the season of 1921 and 1922 with temperature and rainfall conditions was made."

LOVELL, JOHN H. (1229)

THE WEATHER AND HONEY PRODUCTION. *Amer. Bee Jour.* 64: 280-283. June, 1924.

The author discusses the effect of rainfall, fog, humidity, temperature, and wind on the production of honey.

LUBIMENKO, VLADIMIR. (1230)

ACTION DIRECTE DE LA LUMIÈRE SUR LA TRANSFORMATION DES SUCRES ABSORBÉS PAR LES PLANTULES DU *PINUS PINEA*. *Compt. Rend. Acad. Sci. [Paris]* 143: 516-519. Oct. 8, 1906.

The author discusses the direct action of light on the sugars absorbed by the plantules of *Pinus pinea*.

(1231)

ACTION SPÉCIFIQUE DES RAYONS LUMINEUX DE DIVERSES COULEURS DANS LA PHOTOSYNTHESE. *Compt. Rend. Acad. Sci. [Paris]* 177: 606-608. Oct. 1, 1923. Also in *Nauch. Inst. Leningrad imeni P. F. Lesgafta.* (*Bul. Inst. Sci. Lesshaft* 8: 143-152. 1924.)

In Russian with French summary.

A brief discussion of the reaction of leaves to different light rays.

LUBIMENKO, VLADIMIR—Continued.

(1232)

INFLUENCE DE LA LUMIÈRE SUR L'ASSIMILATION DES RÉSERVES ORGANIQUES DES GRAINES ET DES BULBES PAR LES PLANTULES, AU COURS DE LEUR GERMINATION. *Compt. Rend. Acad. Sci. [Paris]* 144: 1060-1063. May 13, 1907.

Experiments made with seeds of wheat, oats, peas, maize, lupine, and onion bulbs show the effect of light on the assimilation of organic substances by the plants.

(1233)

INFLUENCE DE LA LUMIÈRE SUR LA GERMINATION DES GRAINES. *Rev. Gén. Bot.* 23: 418-436. Oct. 15, 1911.

A study of the effect of light on the germination of certain seeds shows that in some cases light stimulates development while in other cases it retards it.

(1234)

INFLUENCE DE LA LUMIÈRE SUR LE DÉVELOPPEMENT DES FRUITS ET DES GRAINES. *Compt. Rend. Acad. Sci. [Paris]* 147: 1326-1328. Dec. 14, 1908.

The author shows the importance of light in the early stages of fruit development; after a certain stage development may be completed in greatly reduced light.

(1235)

INFLUENCE DE LA LUMIÈRE SUR LE DÉVELOPPEMENT DES FRUITS ET DES GRAINES CHEZ LES VÉGÉTAUX SUPÉRIEURS. *Rev. Gén. Bot.* 22: 145-175. Apr. 15, 1910.

The author emphasizes the important rôle played by light in the development of plants of higher order.

(1236)

OBSERVATIONS SUR LA PRODUCTION DE LA CHLOROPHYLLE CHEZ LES VÉGÉTAUX SUPÉRIEURS AUX DIFFÉRENTES INTENSITÉS LUMINEUSES. *Compt. Rend. Acad. Sci. [Paris]* 145: 1347-1349. Dec. 23, 1907.

The author finds that the optimum illumination for the production of chlorophyll is inferior to the maximum light intensity.

(1237)

RECHERCHES SUR LE VERDISSEMENT DES PLANTES. *Bul. Princ. Jard. Bot. Répub. Russ.* 20: 137-150. 1921.

In Russian, with French summary.

The author has investigated the effect of intense light on the green pigment of barley and oats.

(1238)

SUR L'ADAPTATION PHOTOPÉRIODIQUE CHEZ LES PLANTES VERTES. *Jour. Soc. Bot. Russ.* 12: 113-162. 1927.

In Russian, with English summary, p. 160-162.

The author discusses the direct and indirect effect of light on green plants.

— and SZEGLOVA, O.

(1239)

L'ADAPTATION PHOTOPÉRIODIQUE DES PLANTES. *Rev. Gén. Bot.* 40: 513-536. 577-590, 675-689, 747-770. 1928.

Photoperiodism of plants is discussed.

— and SZEGLOFF, O.

(1240)

SUR L'ADAPTATION DES PLANTES À LA DURÉE DE LA PÉRIODE CLAIRE DE LA JOURNÉE. *Compt. Rend. Acad. Sci. [Paris]* 176: 1915-1918. June 25, 1923.

The effect of daylight on plant development is discussed.

LUCE, W.

(1241)

CAUSE OF WINTER FRUIT INJURIES TRACED. *Better Fruit* 19 (12): 11. June, 1925.

LUDWIGS, KARL.

(1242)

DER EINFLUSS NIEDERER TEMPERATUREN AUF DIE ENTWICKLUNG DER GEMÜSE. *Obst u. Gemüsebau* 76 (Hft. 5): 74-76. May 21, 1930.

An account of the influence of low temperatures on the development of vegetables.

LÜDIN, H.

(1243)

UNTERSUCHUNGEN ÜBER DIE TRANSPIRATION VON SONNEN- UND SCHATTEN-PFLANZEN. *Verhandl. Natur. Gesell. Basel* 39: 176-215. 1927-28.

A study of transpiration in plants grown in sunlight and in shade.

- LUEG, HEINRICH. (1244)
DIE BEDEUTUNG VERSCHIEDENER UNTERSUCHUNGSMETHODEN ZUR BESTIMMUNG DER RELATIVEN WINTERFESTIGKEIT VON WINTERWEIZENSORTEN. Wiss. Arch. Landw., Abt. A., Pflanzenbau 1: 725-803. 1929.
This is a study of the power to resist low temperatures of different varieties of wheat.
- LÜSTNER, GUSTAV. (1245)
ÜBER WINDSCHÄDEN AN OBSTBÄUMEN. Ber. Lehr u. Forschungsanst. Wein, Obst u. Gartenbau Geisenheim. 1907: 305-309.
Damage done to fruit trees by wind is discussed.
- _____. (1246)
UNTERSUCHUNGEN ÜBER DIE PERONOSPORAEPIDEMIEEN DER JAHRE 1905 UND 1906. Ber. Lehr u. Forschungsanst. Wein, Obst. u. Gartenbau Geisenheim 1906: 119-140.
The influence of weather conditions on the outbreak of certain plant diseases is studied.
- LUGGER, OTTO. (1247)
FROSTED AND RUSTED WHEAT. p. 46-67. University Farm, St. Paul, 1889. (Minn. Agr. Expt. Sta. Bul. 5.)
An account is given of the "physiological phenomena that take place in a freezing plant." p. 46-53.
- LUNDEGÅRDH, HENRIK. (1248)
DIE BEDEUTUNG DER LICHTRICHTUNG FÜR DEN PHOTOTROPISMUS. Ber. Deut. Bot. Gesell. 37: 229-236. Aug. 22. 1919.
The effect of light on plant growth is discussed.
- _____. (1249)
DIE BEZIEHUNGEN ZWISCHEN DER LICHTWACHSTUMSREAKTION UND DEM PHOTOTROPISMUS. Ber. Deut. Bot. Gesell. 39: 195-200. June 23, 1921.
The relations between light-growth-reaction and phototropism are discussed.
- _____. (1249a)
ENVIRONMENT AND PLANT DEVELOPMENT BEING "KLIMA UND BODEN IN IHRER WIRKUNG AUF DAS PFLANZENLEBEN." Transl. and ed. from the second German edition by Eric Ashby. 330 p. London, Edward Arnold & Co., 1931.
Among the chapter headings are The Light Factor, The Temperature Factor, and The Water Factor. An extensive bibliography is appended.
- _____. (1250)
KLIMA UND BODEN IN IHRER WIRKUNG AUF DAS PFLANZENLEBEN. 2. Verb. Aufl. 480 p. Jena, Gustav Fischer, 1930.
The author discusses the influence of light, temperature, and water (rainfall, moisture) on plant life.
- _____. (1251)
DER TEMPERATURFAKTOR BEI KOHLENSÄUREASSIMILATION UND ATMUNG. Biochem. Ztschr. 154: 195-234. Dec. 31, 1924.
The effect of temperature on assimilation and breathing of plants is studied.
- LUTMAN, B. F. (1252)
PLANT DISEASES. TWENTY YEARS' SPRAYING FOR POTATO DISEASES. POTATO DISEASES AND THE WEATHER. p. 213-296. Burlington, 1911. (Vt. Agr. Expt. Sta. Bul. 159.)
"It is not easy to define the exact weather conditions that call forth an epidemic of *Phytophthora infestans*. Doubtless rainfall is the chief factor, but it is one that is limited in its effects by temperature and sunshine and also, probably, by winds."
- LUYTEN, IDA. (1253)
DE PERIODICITEIT VAN DE KNOPONTWIKKELING BIJ DEN PRUIM. Meded. Landbouwhooges. [Wageningen] 18: 103-148. 1921.
English summary, p. 139-142.
"On the periodicity of the development of the bud in the plum."
- LYON, C. J. (1254)
A PHAENOLOGICAL STUDY IN NEW ENGLAND. Torreya 22 (2): 19-22. Mar.-Apr., 1922.
The author establishes a definite correlation between the temperature and the date of flowering of plants in New England by a study carried on from 1917 to 1921.

- LYON, T. L. (1255)
THE ADAPTATION AND IMPROVEMENT OF WINTER WHEAT. 23 p. Lincoln, 1902.
(Nebr. Agr. Expt. Sta. Bul. 72.)
The relative winter-hardiness of 118 varieties of wheat was tested from 1897-1901.
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- THE RELATION OF WHEAT TO CLIMATE AND SOIL. Amer. Soc. Agron. Proc. 1: 108-125. 1907-09. (1256)
"Wheat yields best in a fairly cool and moist atmosphere, and with a rainfall sufficient to maintain a fair supply of soil moisture."
- MCADIE, ALEXANDER G. (1257)
FROST FIGHTING. 15 p. Washington, 1900. (U. S. Dept. Agr. Weather Bur. Bul. 29.)
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- PROTECTING THE CALIFORNIA ORANGE CROP FROM FROST. U. S. Mo. Weather Rev. 39: 1910-1912. Dec., 1911. (1257a)
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- REPORT ON RECENT DESTRUCTIVE FROSTS IN CALIFORNIA. U. S. Mo. Weather Rev. 41: 120-122. Jan., 1913. (1258)
Contains several reports of damage done to citrus fruit in California from unusually low temperatures.
-
- SAVING THE CROPS FROM INJURY BY FROST. Geogr. Rev. 4: 351-358. Nov., 1917. (1259)
The author discusses methods by which farmers may save their crops from frost.
-
- WORK OF THE WEATHER BUREAU IN PROTECTING FRUIT; ESPECIALLY FROST PROTECTION. U. S. Mo. Weather Rev. 39: 275-276. Feb., 1911. (1260)
The effect of frost on fruit and methods of combating it are discussed.
- MCBETH, IRA G. (1261)
INVESTIGATION ON THE FREEZING POINT OF CITRUS FRUIT. Calif. Citrus Inst. Rpt. 1: 72-77. 1919-20.
- MCCLATCHIE, ALFRED J., and COIT, J. ELIOT. (1262)
RELATION OF WEATHER TO CROPS AND VARIETIES ADAPTED TO ARIZONA CONDITIONS. p. 44-118. Tucson, 1916. (Ariz. Agr. Expt. Sta. Bul. 78.)
"This publication is a thorough revision of Bulletin 61, by J. Eliot Coit, which, in turn, was a revision of part 3 of Bulletin 48, by Alfred J. McClatchie . . . In the study that has been made of the effects of the weather upon crops, five factors have been considered—temperature, direct sunshine, relative humidity, rainfall, and wind. Of these five the first has the greatest influence, and the last the least influence."
- MCCLELLAND, C. K. (1263)
EFFECT OF DIFFERENT DATES OF PLANTING CORN ON YIELDS. 14 p. Fayetteville, 1927. (Ark. Agr. Expt. Sta. Bul. 222.)
Rainfall has a considerable effect in determining the dates of planting corn.
-
- THE TIME AT WHICH COTTON USES THE MOST MOISTURE. Jour. Amer. Soc. Agron. 10: 185-189. Apr., 1918. (1264)
"There is a great difference in the stage of growth when [corn and oats on the one hand and cotton on the other] require the maximum amounts of water . . . If the results here presented are of any value, they indicate that later cultivation than is usually given would be of benefit in conserving soil moisture for the use of the plants during the hot summer weather."
- MCCLELLAND, T. B. (1265)
EFFECT OF VARIATION IN DAY LENGTH ON GROWTH OF CERTAIN PLANTS. Porto Rico Agr. Expt. Sta. Rpt. 1924: 10-11.
"Although planting may be made every day in the year in Porto Rico, so far as the temperature is concerned, plant growth is influenced to such an extent by any variation in normal day length as to make the planting season in many instances the deciding factor for success or failure."
-
- THE PHOTOPERIODISM OF TEPHROSIA CANDIDA. Jour. Agr. Research 28: 445-460. May 3, 1924. (1266)

McClelland, T. B.—Continued.

"Any change in day length [is] sufficient to exert a marked influence on plant growth," even in the Tropics. The author shows that "day length not only determines the blossoming season for *T. candida*, but it also affects its growth in a pronounced and decided manner, the longer days producing growth with longer internodes and larger leaves."

(1267)

STUDIES OF THE PHOTOPERIODISM OF SOME ECONOMIC PLANTS. Jour. Agr. Research 37: 603-628. Nov. 15, 1928.

The author studies the photoperiodism of sweet potatoes, onions, corn, pineapples, potatoes, and beans.

McCook, L.

(1268)

RAINFALL AND PRODUCTION. Agr. Gaz. N. S. Wales 26: 389-390. May 3, 1915.

Two charts showing rainfall and wheat production from 1873 to 1914 are briefly discussed.

McCubbin, William A.

(1269)

WINTER INJURY. Forest Leaves 20: 4-5. Feb., 1925.

Seven distinct types of winter injury which affect the woody tissues of trees and shrubs are listed.

McDonald, W. F.

(1270)

CLIMATIC FACTORS IN THE AGRICULTURE OF LOUISIANA AND SOUTHERN MISSISSIPPI. 44 p. Baton Rouge, 1926. (La. Agr. Col. Ext. Circ. 89, pt. 2.)

The relation of meteorological factors to agriculture is discussed especially as applied to the products of Louisiana and southern Mississippi.

(1271)

A STUDY OF WEATHER INFLUENCES ON SUGARCANE PRODUCTION IN LOUISIANA. 38 p. [New Orleans? 1926.]

"Reprinted from the Planter and Sugar Manufacturer, May 29, 1926-July 17, 1926, inclusive."

Literature cited, p. 37-38.

A high degree of correlation is found to exist between seasonal rainfall and sugar yield in Louisiana.

(1272)

WEATHER AND SUGARCANE IN LOUISIANA. La. Planter 76: 428-430, 449-451, 468-470, 489-492, 509-512; 77: 8-10, 31-32, 49-52. 1926.

Summarized in U. S. Mo. Weather Rev. 54: 367-369. Sept., 1926.

The relations between temperature, rainfall, sunshine, and the growth and ripening of sugarcane in Louisiana are discussed.

(1273)

THE WEATHER INFLUENCES WHICH CONDITION THE PLANT CHEMISTRY OF SUGAR CANE. La. Planter 79: 385-387. Nov. 12, 1927.

Full abstract of an address delivered before the Louisiana section of the American Chemical Society, New Orleans, La., Oct. 21, 1927.

It appears that "the most important periods of weather are in the winter and spring preceding the crop." Comparatively dry winter and a warm March produce higher yields, while March frosts greatly reduce the yield.

MacDougal, Daniel T.

(1274)

THE AUXO-THERMAL INTEGRATION OF CLIMATIC COMPLEXES. Amer. Jour. Bot. 1: 186-193. Apr., 1914.

The author discusses a method of summation of temperature effects upon plant growth which takes into consideration the duration and intensity of the temperature exposure. A graph shows relations of growth of wheat to temperature.

(1275)

CRITICAL POINTS IN THE RELATION OF LIGHT TO PLANTS. Science (n. s.) 13: 252. Feb. 15, 1901.

"Light exercises a direct chemical effect upon the substances of which protoplasm is composed; it stimulates protoplasm to the formation of chlorophyll . . . ; it constitutes a source of energy . . . ; absence of light constitutes a specific stimulus, calling out the various reactions of etiolation; light acts as a directive or orienting stimulus to which the plant responds by locomotory or bending movements."

(1276)

GROWTH OF TREES. Sci. Mo. 21: 99-103. July, 1925.

In a radio talk the author tells of the effect of temperature on tree growth.

MACDOUGAL, DANIEL T.—Continued.

(1277)

GROWTH OF WHEAT (TRITICUM) AND CORN (ZEA). Carnegie Inst. Wash. Yearbook 16: 85-87. 1917.

The effect of temperature on the growth of wheat and corn is discussed.

(1278)

HOW PLANTS ENDURE HEAT AND COLD. A SIDELIGHT ON THE EVERYDAY QUESTION OF HARDINESS AND WHY A DIMINISHED WATER SUPPLY MEANS INCREASED RESISTANCE. Gard. Mag. 36: 152-154. Nov., 1922.

(1279)

INFLUENCE OF ARIDITY UPON THE EVOLUTIONARY DEVELOPMENTS OF PLANTS. Plant World 12: 217-231. Oct., 1909.

(1280)

THE INFLUENCE OF LIGHT AND DARKNESS UPON GROWTH AND DEVELOPMENT. 319 p. New York, 1903. (Mem. N. Y. Bot. Gard. v. 2.)

"References are given to the literature of the subject from 1686 to 1902."

"The results described in the following pages were obtained by a series of experimental observations begun in 1895 and continued until the close of the year 1902. Originally designed to analyze the phenomena of etiolation, the work has naturally led to a consideration of the more general relations of the plant to light, and it is believed that some important additions to the knowledge of the subject have been made."—Author's Preface.

(1281)

THE INFLUENCE OF LIGHT AND DARKNESS UPON GROWTH AND DEVELOPMENT. Summary by Raymond H. Pond. U. S. Mo. Weather Rev. 31: 180-184. April, 1903.

"In the above-mentioned memoir of over three hundred pages . . . Professor MacDougal has recorded the most efficient investigation ever made of the influence of light and darkness upon growth and development. The subjects included are, first, the literature, of which a most thorough study is evident; second, experiments in detail with most admirable and appropriate illustrations, including graphic representation of measurements; third, general considerations, comprising critical discussion of experimental data and their interpretation."

(1282)

LIGHT AND RATE OF GROWTH IN PLANTS. Science (n. s.) 41: 467-468. Mar. 26, 1915.

"Light and temperature in lesser degree are seen to exercise a totalized releasing effect on growth coincident with reduced acidity and increased hydration to a certain limit. Beyond this growth rate is checked."

—AND OTHERS.

(1283)

END RESULTS OF DESICCATION AND RESPIRATION IN SUCCULENT PLANTS. Physiol. Researches 1: 289-325. Aug., 1915.

"A number of large, sound individuals of Echinocactus and of severed joints of flat stems of Opuntia were deprived of a water supply, and compelled to carry on existence at the expense of accumulated water and food material. Some of the preparations were exposed to the full illumination to which they were accustomed, and others were placed in diffuse light, obtaining differential effects in water loss, respiration, disintegration of acids, and photosynthesis." The principal generalizations arising from the studies are given.

McDOUGAL, E. G.

(1284)

INFLUENCE OF CLIMATE ON THE YIELD AND QUALITY OF SUGAR BEET IN CANADA. Canada Bur. Statist., Mo. Bul. Agr. Statist. 13: 295-301. Oct., 1920.

"The yield is closely related with the mean temperature and (in a less degree) with the mean relative humidity of the growing season . . . Within ordinary limits, the yield of sugar beets is little affected by variations in rainfall, provided that the crop is thoroughly cultivated." Tables give coefficients of correlation between beet crops and weather factors.

MACFARLANE, JOHN M.

(1285)

THE RELATION OF PLANT PROTOPLASM TO ITS ENVIRONMENT. Jour. Acad. Nat. Sci., Phila. (2) 15: 251-271. 1912.

The author discusses the temperature adaptability of plant protoplasm.

- MACHALICA, JOZEF J. (1286)
CONTRIBUTION À L'ÉTUDE DE L'APTITUDE DES GRAINES DE SEIGLE, DE FROMENT, D'ORGE ET D'AVOINE POUR PRENDRE ET TIRER PROFIT DE L'HUMIDITÉ HYGROSCOPIQUE DE L'ATMOSPHERE PENDANT LA GERMINATION. Polish Agr. and Forestal Ann. 15: 407-423. Mar.-Apr., 1926.
In Russian, with German summary.
The absorption and utilization of atmospheric moisture by seeds of wheat, rye, barley, and oats.
- MACK, WARREN B. (1287)
THE RELATION OF TEMPERATURE AND THE PARTIAL PRESSURE OF OXYGEN TO RESPIRATION AND GROWTH IN GERMINATING WHEAT. Plant Physiol. 5: 1-68. Jan., 1930.
"This paper presents the results of an experimental study on CO₂ production and shoot elongation in very young wheat seedlings subjected to 60 different maintained environmental complexes representing a wide range of temperatures and of partial pressures of oxygen in the culture solution in which the seedlings were submerged."
- MACKENZIE, MARION. (1288)
PHYTO-PHENOLOGY IN ITS APPLICATION TO THE PLANTS OF THE PHILADELPHIA NEIGHBORHOOD. Penn. Univ. Bot. Lab. Contrib. 3: 288-427. 1911.
The results of the series of experiments recorded lead to the following conclusions: (1) The most potent factor in plant development and growth is temperature; (2) absence of light does not retard flower formation; (3) potted plants in darkness shoot up rapidly . . . Plants in darkness are generally poor and stalky; (4) some plants require a winter rest period only; (5) the plants observed evidently require an amount of freezing, as well as the winter rest period, before they can develop; (6) there is a maximum temperature for optimum growth and development of plants; and (7) plants which have been developed in darkness may recover the power to form chlorophyll and become green when placed in the light.
- MCLEAN, FORMAN T. (1289)
THE IMPORTANCE OF CLIMATOLOGY TO TROPICAL AGRICULTURE. Philippine Agr. 7: 191-194. Feb., 1919.
Weather conditions as affecting vegetation in the Philippines are discussed.
- _____ (1290)
A PRELIMINARY STUDY OF CLIMATIC CONDITIONS IN MARYLAND AS RELATED TO PLANT GROWTH. Physiol. Researches 2: 129-208. Feb. 1917.
This paper discusses the relation of temperature, moisture, and light conditions to the growth of soybean seedlings.
- _____ (1291)
RELATION OF CLIMATE TO PLANT GROWTH IN MARYLAND. U. S. Mo. Weather Rev. 43: 65-72. Feb., 1915.
The author discusses several new methods of approach to the problem of relations between weather conditions and plant growth. "Some quite tentative, but nevertheless, apparently important results have been obtained."
- MACMILLAN, HOWARD G. (1292)
AN EPIDEMIC OF CORN SMUT FOLLOWING HAIL. Phytopathology 8: 584-585. Nov., 1918.
- _____ (1293)
A FROST INJURY OF POTATOES. Phytopathology 10: 423-424. Sept., 1920.
- _____ (1294)
INFLUENCE OF THE METEOROLOGICAL FACTORS ON POTATO DISEASE AND PRODUCTION IN COLORADO. (Abstract.) Phytopathology 12: 445. Sept., 1922.
Abstract of a paper presented at the sixth annual meeting of the Pacific division, American Phytopathological Society, Salt Lake City, Utah, June 22-24, 1922.
"Temperature and factors influencing temperature appear to affect the potato yield in Colorado."
— and BYARS, L. P. (1295)
HEAT INJURY TO BEANS IN COLORADO. Phytopathology 10: 365-367. July, 1920.
- _____ (1296)
— and MECKSTROTH, G. A.
THE CRITICAL TEMPERATURE FOR INFECTION OF THE POTATO SEED PIECE BY FUSARIUM OXYSPORUM. Jour. Agr. Research 31: 917-921. Nov. 15, 1925.

MACMILLAN, HOWARD G., and MECKSTROTH, G. A.

"Of the factors influencing the development of this disease one of the most important is temperature, for it is an element of the environment to which both host and parasite respond."

McMURRAN, STOCKTON M. (1297)

WINTER KILLING, SUN SCALD, OR SOUR SAP OF PECANS. *Amer. Nut Jour.* 3 (5): 82. Nov., 1915.

McNAIR, JAMES B. (1298)

THE TAXONOMIC AND CLIMATIC DISTRIBUTION OF OIL AND STARCH IN SEEDS IN RELATION TO THE PHYSICAL AND CHEMICAL PROPERTIES OF BOTH SUBSTANCES. *Amer. Jour. Bot.* 17: 662-668. July, 1930.

"Observation of the percentages obtained above indicates that because a large percentage of oil occurs in the seeds of tropical and temperate plants it may function as a protection against rapid temperature changes. The increased frequency of oil in the seeds of temperate plants is in accordance with the increased fuel value of oil over starch."

MACOUN, WILLIAM T. (1299)

A FEW FACTS OBTAINED BY GROWING VEGETABLES IN A CHEESECLOTH ENCLOSURE IN 1903. *Amer. Soc. Hort. Sci. Proc.* 1903-4: 34-37.

(1300)

OBSERVATIONS ON HARDINESS IN THE COLDER PARTS OF CANADA. *Amer. Soc. Hort. Sci. Proc.* 1921: 160-165.

(1301)

OVERCOMING WINTER INJURY. *Amer. Soc. Hort. Sci. Proc.* 1908-9: 15-27.

Various types of winter injury to fruit trees are briefly discussed.

(1302)

THE RELATION OF CLIMATE TO HORTICULTURE. *Amer. Soc. Hort. Sci. Proc.* 1912: 55-75.

A general discussion of the influence of weather conditions on horticultural plants.

(1303)

THE RELATION OF WINTER APPLES TO HARDINESS OF TREE. *Amer. Soc. Hort. Sci. Proc.* 1906: 7-11.

(1304)

WINTER INJURY IN CANADA. *Amer. Soc. Hort. Sci. Proc.* 1918: 13-17.

The effect of winter injury to fruit trees is discussed.

(1305)

WINTER INJURY TO FRUIT TREES—TEN DIFFERENT WAYS IN WHICH TREES ARE AFFECTED. *Canada Exp. Farms Rpt.* 1908: 110-116.

McPHEE, HUGH C. (1306)

THE INFLUENCE OF ENVIRONMENT ON SEX IN HEMP, *CANNABIS SATIVA* L. *Jour. Agr. Research* 28: 1067-1080. June 14, 1924.

"The ultimate height attained by hemp appears to be due largely to the length of the period of rapid rate of growth . . . [which] seems to be roughly proportional to the length of daily exposure to light . . . The time of flowering of hemp is largely controlled by the relative length of day and night."

MAGISTAD, O. C., and TRUOG, E. (1307)

THE INFLUENCE OF FERTILIZERS IN PROTECTING CORN AGAINST FREEZING. *Jour. Amer. Soc. Agron.* 17: 517-526. Sept., 1925.

MAGNE, GEORGES. (1308)

INFLUENCE DE LA NEIGE SUR LA GERMINATION DES GRAINES ET ESSAIS D'EXPLICATION DE CETTE INFLUENCE. *Bul. Soc. Nat. Acclim. France* 50: 100-104. Mar., 1903.

A brief account of the effect of snow on the germination of seeds.

MAGNESS, J. R. (1309)

EFFECT OF LIGHT EXPOSURE ON PLANT GROWTH. *Bot. Gaz.* 70: 246-247. Sept., 1920.

A discussion of the findings of Garner and Allard, and others.

(1310)

OBSERVATIONS ON THE RELATION OF CLIMATIC CONDITIONS TO VARIETY ADAPTABILITY IN APPLES. *Amer. Soc. Hort. Sci. Proc.* 1916: 360-363.

"A careful analysis of the data secured during the past four years indicates that the interval between the period of full bloom and the time of ripening is the greatest factor in apple variety adaptability."

- MAGNESS, J. R.—Continued. (1311)
PRELIMINARY REPORT UPON THE INFLUENCE OF CLIMATIC CONDITIONS ON THE
RIPENING PROCESSES IN APPLES. Amer. Soc. Hort. Sci. Proc. 1923: 108-
113.
- MAGOON, C. A., and CULPEPPER, C. W. (1312)
THE RELATION OF SEASONAL FACTORS TO QUALITY IN SWEET CORN. Jour. Agr.
Research 33: 1043-1072. Dec. 1, 1926.
The influence of seasonal factors, including temperature, rainfall, sun-
shine, and frost, on the rate of development and maturing of sweet corn
is studied.
- MAIDMENT, W. T. O. (1313)
CORRELATION BETWEEN RAINFALL AND CACAO YIELDS IN THE GOLD COAST, WITH
SPECIAL REFERENCE TO EFFECT OF APRIL RAINS ON THE FOLLOWING CACAO
CROP. Gold Coast Dept. Agr. Bul. 13: 83-84. 1928.
A distinct parallelism is shown between the monthly rainfall and the
monthly cacao yield in three different localities by means of graphs.
- MATREAU. (1314)
LES BLÉS ET L'HIVER 1928-1929. Jour. Agr. Prat. 51: 369-370. May 11, 1929.
Not seen.
The effect of the winter of 1928-29 on wheat.
- MAKSIMOV, NICOLAUS A. (1315)
DROUGHT RESISTANT PLANTS FROM A PHYSIOLOGICAL VIEWPOINT. Jour. Expt.
Landw., t. 22, abs. 1. 1921-1923.
In Russian.
- IMPORTANCE IN THE LIFE OF THE PLANT OF THE RATIO BETWEEN LENGTH OF
DAY AND LENGTH OF NIGHT (PHOTOPERIODISM). Trudy Prikl. i Selekt. (Bul.
Appl. Bot. and Plant Breeding) 14 (5): 69-90. 1924-25.
In Russian. (1316)
- INTERNAL FACTORS OF FROST AND DROUGHT RESISTANCE OF PLANTS. Trudy
Prikl. Bot. i Selekt. (Bul. Appl. Bot. and Plant Breeding) 22 (1):
3-41. 1929. (1317)
In Russian, with English summary. Translation in Protoplasma 7:
259-291. July, 1929.
- THE PHYSIOLOGICAL BASIS OF DROUGHT RESISTANCE OF PLANTS. 436 p. Lenin-
grad, 1926. (1318)
In Russian, with English summary.
- THE PHYSIOLOGICAL NATURE OF DROUGHT-RESISTANCE OF PLANTS Internatl.
Cong. Plant Sci. Proc. 1926: 1169-1175. Ithaca, N. Y., Aug. 16-23. (1319)
- THE PLANT IN RELATION TO WATER. 451 p. New York, The Macmillan Co.,
1929. (1320)
Review in Jour. Amer. Soc. Agron. 22: 93-94. Jan., 1930.
The drought resistance of plants and the laws which govern the absorp-
tion and transpiration of water are discussed, as well as leaf structure
in relation to light and shade, atmospheric humidity, and soil moisture
supply.
- and KRASNOSSELSKY-MAXIMOV, T. A. (1321)
[WILTING OF PLANTS IN ITS CONNECTION WITH DROUGHT-RESISTANCE.] Trav.
Soc. Nat. Leningrad. Bot. 47-53 (livr. 3): 81-107. 1917-1923.
In Russian, with English summary. Translation in Jour. Ecology 12:
95-110. Jan., 1924.
- MALLET, LOUIS. (1322)
LA SÉCHERESSE EN 1923. RAPPORT ENTRE LA SÉCHERESSE ET LA PRODUCTION.
Progrès Agr. et Vitic. 40: 228-238. Aug. 26, 1923.
Abstract in Expt. Sta. Rec. 49: 808. 1924.
"Data regarding the drought of 1923 in the region of Montpellier and
those of preceding years (since 1839) are given and used as a basis for
correlating rainfall deficiency with grape production."
- MANARESI, ANGELO. (1323)
LE GELATE PRIMAVERILI DEL 1925. Ital. Agr. 62: 422-425. Aug. 15, 1925.
An account of the effect of the spring frosts of 1925 on fruit trees in
Italy.

MANARESI, ANGELO—Continued. (1324)

LE GELATE PRIMAVERILI DEL 1929 E GLI ALBERI DA FRUTTO. Ital. Agr. 66: 605-608. Aug., 1929.

A brief account of the effect of the frosts of the spring of 1929 on fruit trees.

(1325)

INTORNO AI DANNI ARRECATI DAL FREDDO INTERNALE ALLE GEMME DEI CILIEGI. Ital. Agr. 66: 527-529. July, 1929.

The damage caused by winter cold to the buds of cherry trees is discussed.

(1326)

SUI DANNI PRODOTTI AI FIORI DEGLI ALBERI FRUTTIFERI DALLE GELATE PRIMAVERILI IN GENERE E DA QUELLE IN PARTICOLARE DEI GIORNI 28, 29, E 30 MARZO 1918. Riv. Patol. Veg. 10 (1-2): 1-26. June 1, 1919.

On damage to fruit tree blossoms by spring frosts.

MANGILI, G. C. (1327)

SULLE MODIFICAZIONI DI STRUTTURA CHE LA LUCE DETERMINA NEL MESOFILLO DELLE PIANTE A FOGLIE PERSISTENTI. Ann. Bot. [Rome] 1: 311-322. Dec. 28, 1904.

The influence of different degrees of light on the structure of the leaves of evergreen plants is studied.

MANN, CHARLES E. T., and WALLACE, T. (1328)

THE EFFECTS OF LEACHING WITH COLD WATER ON THE FOLIAGE OF THE APPLE. Jour. Pomol. and Hort. Sci. 4: 146-161. June, 1925.

"The behavior of the foliage of certain varieties of apple trees when subjected to immersion in water and subsequent exposure to the air is described."

MARAIS, EUGÈNE NIELEN. (1329)

NOTES ON SOME EFFECTS OF EXTREME DROUGHT IN WATERBERG, SOUTH AFRICA. So. Africa Dept. Agr. Agr. Jour. 7: 161-170. Feb., 1914. Reprinted in Smithsn. Inst. Ann. Rpt. 1914: 511-522.

MARANI, M., DOTTI, F., and CIRIO, L. (1330)

OSSERVAZIONI INTORNO AI DANNI PRODOTTI DAL GELO NELLA PROVINCIA DI RAVENNA. Ital. Agr. 66: 144-156. Mar., 1929.

A study of the effect of frost on fruit trees in the Province of Ravenna.

MARBURY, J. B. (1331)

RELATION OF WEATHER CONDITIONS TO GROWTH AND DEVELOPMENT OF COTTON. Cotton 73 (2): 51-53. Dec., 1908; (3): 88-90. Jan., 1909.

"Cotton, though a sensitive plant, is of all summer-growing crops of the South about the least affected by ordinary changes in the weather." The author studies the relation between rainfall and temperature and the growth of cotton at different periods. He finds that rainfall has a stronger influence upon the development of cotton than sunshine.

(1332)

RELATION OF WEATHER CONDITIONS TO GROWTH AND DEVELOPMENT OF COTTON. U. S. Dept. Agr. Yearbook 1904: 141-150. 1905.

"It being a well-established fact that the temperature and the amount and distribution of rainfall are vital factors in the growth and maturity of all crops, a careful study of these elements in conjunction with the average yield of cotton per acre for each year since 1893 has been made, and . . . results deduced as to the weather conditions most favorable for the growth and development of this important crop."

MARCARELLI, B. (1333)

IL DANNO ARRECATO AI RISI DALLE ULTIME AVVERSITÀ METEORICHE. Gior. Risc. 5: 212-216. July 15, 1915.

Contains an account of the effect on young rice plants at Vercelli of a considerable fall of temperature accompanied by persistent rainfall at a critical period of growth.

(1334)

LA FREQUENZA DI BASSE TEMPERATURE NEL VERCELLESE E LORO EFFETTO SULLA COLTIVAZIONE DEL RISO. Gior. Risc. 5: 355-360. Nov. 30, 1915.

The author discusses the importance of low temperatures in the early stages of the rice crop.

- MARCARELLI, B.—Continued. (1335)
 LA PRODUZIONE RISCICOLA 1917 NEL VERCELLESE IN RELAZIONE AI PRINCIPALI
 FATTORI METEOROLOGICI. *Gior. Risc.* 8: 7-16. Jan. 31, 1918.
 Temperature, light, and dry weather are the most important meteorological factors in the growth of rice.
- MARESCALCHI, ARTURO. (1336)
 UNA PAGINA DI METEOROLOGIA VITICOLA. 40 ANNI DI OSSERVAZIONI NEL MONFERRATO. *Ann. R. Accad. Agr. Torino*. 57: 218-232. 1914.
 The author gives the results of observations made from 1875 to 1914 on the relation between temperature, rainfall, light, and the vine crop in the district of Lower Monferrato in Piedmont.
- MARIANI, GIUDITTA. (1337)
 INTORNO ALL'INFLUENZA DELL'UMIDITÀ SULLA FORMAZIONE E SULLO SVILUPPO DEGLI STOMI NEI COTILEDONI. *Atti Inst. Bot. R. Univ. Pavia* (2) 8: 67-98. 1904.
 The effect of light and humidity on cotyledons is studied.
- MARLOTH, R. (1338)
 RESULTS OF EXPERIMENTS ON TABLE MOUNTAIN FOR ASCERTAINING THE AMOUNT OF MOISTURE DEPOSITED FROM THE SOUTHEAST CLOUDS. *So. African Phil. Soc. Trans.* 14: 403-408; 1903; 16: 97-105. 1905.
 The author explains that the luxuriant and thickly set vegetation on the tops of the mountains is due to the amount of moisture to which it is exposed and which is largely supplied by the southeast clouds.
- MARSHALL, ROBERT. (1339)
 INFLUENCE OF PRECIPITATION CYCLES ON FORESTRY. *Jour. Forestry* 25: 415-429. April, 1927.
 A study of the varying amount of precipitation in northern Idaho over a number of years shows its bearing on tree growth.
- MARTIN, HOWARD H. (1339a)
 HOURLY FREQUENCY OF PRECIPITATION IN CENTRAL OHIO AND ITS RELATION TO AGRICULTURAL PURSUITS. *U. S. Mo. Weather Rev.* 46: 375-376. 1918.
- MARTIN, J. P., and LEE, H. ATHERTON. (1340)
 THE EFFECT OF DRYING ON THE SPORES OF THE EYE SPOT FUNGUS. *Hawaii. Planters' Rec.* 30: 475-476. Oct., 1926.
- MARTIN, JOHN H. (1341)
 COMPARATIVE STUDIES OF WINTER HARDINESS IN WHEAT. *Jour. Agr. Research* 35: 493-535. Sept. 15, 1927.
 The author discusses the irregularity in the winter-killing of wheat in so far as it is influenced by temperature.
- FACTORS INFLUENCING RESULTS FROM RATE-AND-DATE-OF-SEEDING EXPERIMENTS WITH WHEAT IN THE WESTERN UNITED STATES. *Jour. Amer. Soc. Agron.* 18: 193-225. Feb., 1926. (1342)
 "It is chiefly the irregularities in moisture, temperature, and diseases which cause the diversity in results of date-of-seeding experiments with wheat."
- MARTIN, WILLIAM H. (1343)
 LATE BLIGHT OF POTATOES AND THE WEATHER. 23 p. New Brunswick, 1923. (N. J. Agr. Expt. Sta. Bul. 384.)
 "While rainfall and temperature are important factors in determining an outbreak of late blight, the influence of one is limited by the other."
- MARTINI, S. (1344)
 IL FREDDO E LE PIANTE. *Met. Prat.* 6 (1): 30-33. Jan.-Feb., 1925.
 A brief discussion of the influence of cold on plants.
- MARTINY, HANS. (1345)
 DIE FELDBERECHNUNG IN MITTELDEUTSCHLAND. *Arb. Deut. Landw. Gesell.* Heft 354. 66 p. 1927.
 Abstract in [Gt. Brit.] *Min. Agr. and Fisheries and Bd. of Agr. for Scotland, Agr. Met. Scheme, Mo. Crop Weather Rpts.* v. 4, no. 8, p. 1-3. May, 1928. [Mimeographed.]
 "As regards the dependence of the crops of the area on rainfall, correlations were made between yields of potatoes and oats over 10 years, and (1) the annual rainfall, (2) the annual number of 'wet' months (i. e., months with over 50-60 mm. rain). With both crops the correlation with yearly rainfall was found to be closer than with the number of wet months; correlation with the latter was poor in very wet or very

MARTINY, HANS—Continued.

dry years. The same facts were established in three different districts tried; and the total rainfall proved a better indication of yield, no matter how the bases were altered on which the number of wet months were reckoned. In this respect Central Germany was found to differ from the rest of the Empire. The yields were closely dependent on the rainfall even on the heavy soils."

MASON, SILAS C. (1346)

DROUGHT RESISTANCE OF THE OLIVE IN THE SOUTHWESTERN STATES. U. S. Dept. Agr., Bur. Plant Indus. Bul. 192, 44 p. 1911.

(1346a)

THE INHIBITIVE EFFECT OF DIRECT SUNLIGHT ON THE GROWTH OF THE DATE PALM. Jour. Agr. Research 31: 455-467. Sept. 1, 1925.

"The reaction of the date palm and a number of other palm genera to light conditions are considered in the present paper."

(1347)

THE MINIMUM TEMPERATURE FOR GROWTH OF THE DATE PALM AND THE ABSENCE OF A RESTING PERIOD. Jour. Agr. Research 31: 401-414. Sept. 1, 1925.

"The conclusion is reached that the zero point or minimum temperature permitting growth of the date palm lies at from 48° to 50° F. for the actual region of cell division and growth, and that this knowledge is fundamental to the study of the reactions of these trees to other temperature conditions."

(1348)

PARTIAL THERMOSTASY OF THE GROWTH CENTER OF THE DATE PALM. Jour. Agr. Research 31: 415-453. Sept. 1, 1925.

"Within favorable temperature limits, and with sufficient water supply, the growth of the date palm is continuous throughout the year, the curve of mean daily leaf elongation being closely parallel to the curve of mean daily temperature. Growth may be continued when the minimum air temperature of the day is several degrees below the freezing point, provided the maximum temperature of the day is well above the growth zero point, 50° F."

MASSART, JEAN. (1349)

L'ACTION DE LA LUMIÈRE CONTINUE SUR LA STRUCTURE DES FEUILLES. Acad. Roy. Belg. Bul. Cl. Sci. (5) 6 (1-3): 37-43. 1920. Reprint Rec. Inst. Bot. Léo Errera. 10: 148-152. 1922.

The author found that, in 10 species investigated, there was no difference between plants grown in continuous, and in intermittent light.

(1350)

QUELQUES ADAPTATIONS VÉGÉTALES AU CLIMAT DE LA CÔTE D'AZUR. Ann. Géogr. 26: 94-105. Mar. 15, 1917.

The author makes a study of vegetation in a part of France which is subject to exceptional weather conditions, and shows that the optimum temperature varies for each stage of growth.

MASSEE, GEORGE E. (1351)

INJURIES TO PLANTS DUE TO HAIL AND FROST. Roy. Bot. Gard. Kew, Bul. Misc. Inform. 2: 53-55. 1909.

MASULLI, OTTAVIANO. (1352)

INFLUENZA DELLE VARIE RADIAZIONI LUMINOSE SULLE PIANTE. Univ. Naples Bul. dell'Orto Bot. 2: 329-402.

A study of the influence of light on plants.

MATTHAEI, GABRIELLE L. C. (1353)

ON THE EFFECT OF TEMPERATURE ON CARBON-DIOXIDE ASSIMILATION. Roy. Soc. [London] Phil. Trans., Ser. B 197: 47-105. 1905.

Experiments are described which show that in the case of leaves of plants "corresponding to each temperature there is a definite amount of assimilation which may be termed the 'maximal assimilation for that temperature' . . . These maximal amounts increase rapidly with increasing temperature . . . The assimilatory activity of a mature leaf is not always the same, but varies considerably with the time of year."

MATTHEWS, EDWIN. (1354)

DROUGHT RESISTANT PLANTS. Florists Exch. 52: 1067, 1073. Nov. 5, 1921.

MATTICE, W. A.

(1355)

RELATION OF SPRING TEMPERATURE TO THE YIELDS OF APPLES IN VIRGINIA. Amer. Met. Soc. Bul. 8 (6-7) : 94. June-July, 1927.

The author's abstract of a paper read at the meeting of the American Meteorological Society in Washington, in 1927, states that "apple yields are affected by the location of an orchard and spring frosts when they occur during, or after, blooming. A correlation with apple yields in Virginia shows that spring temperatures are very important and probably are the controlling factor."

(1356)

THE RELATION OF SPRING TEMPERATURES TO APPLE YIELDS. U. S. Mo. Weather Rev. 55: 456-459. Oct., 1927.

The author proves that apple yields are largely affected by spring temperatures.

(1357)

WEATHER AND HAY IN NEW YORK STATE. U. S. Mo. Weather Rev. 54: 461. Nov., 1926.

"The weather of the spring months is the most important in hay production in New York State, and no single month is as important as a combination of months. The most important factor is the rainfall from April to June, inclusive, and the second in importance is the May to June mean temperature."

(1358)

THE WEATHER INFLUENCE ON CROP PRODUCTION IN REGIONS OF SCANTY RAIN-FALL. U. S. Mo. Weather Rev. 54: 336-341. Aug., 1926.

A study of the data derived from an investigation of the cultivation of wheat, oats, barley, and corn at Akron, Colo., shows that in this region the amount of seasonal or annual rainfall is the limiting factor for successful crop production.

MAXIMOV, N. A.

(1359)

EXPERIMENTELLE UND KRITISCHE UNTERSUCHUNGEN ÜBER DAS GEFRIEREN UND ERFRIEREN DER PFLANZEN. Jahrb. Wiss. Bot. 53: 325-420. 1914.

The author concludes that plants do not die from the effects of low temperatures as such but from the physicochemical changes brought about by the formation of ice in their tissues.

(1360)

THE PLANT IN RELATION TO WATER. A STUDY OF THE PHYSIOLOGICAL BASIS OF DROUGHT RESISTANCE. (Authorized English translation) Ed. with notes by R. H. Yapp. 451 p. London, George Allen and Unwin (Ltd.), 1929. Abstract in Emp. Cotton Growing Rev. 6: 267. July, 1929.

"Part I deals with the absorption of water; Part II with its loss, and Part III with the water balance and drought resistance of plants. In this part more especially, it will be realized that various long-cherished ideas in connection with transpiration in dry climates, absorption of water in salt soils, etc., stand in need of drastic revision."

MAZÉ, P.

(1361)

LA TEMPÉRATURE MOYENNE DES FEUILLES DU MAÏS EXPOSÉES AU SOLEIL. Compt. Rend. Acad. Sci [Paris] 188: 567-569. Feb. 18, 1929.

The effect of sunlight on the average temperature of leaves of maize is discussed.

MEADE, R. M.

(1362)

POSITIONS AND MOVEMENTS OF COTTON LEAVES. HOW LEAVES ADJUST THEIR POSITION TO VARYING CONDITIONS OF ILLUMINATION AND OF SOIL MOISTURE. Jour. Heredity 12: 444-448. Dec., 1921.

"The leaves of the cotton plant are capable of definite movements which are made in direct reaction to sunlight."

MEINECKE, EMIL P.

(1363)

AN EFFECT OF DROUGHT IN THE FORESTS OF THE SIERRA NEVADA. Phytopathology 15: 549-553. Sept., 1925.

MELHUS, IRVING E.

(1364)

THE RELATION OF TEMPERATURE TO SPORE GERMINATION AND INFECTION WITH CYSTOPUS. (Abstract) Phytopathology 1: 69. Apr., 1911.

Abstract of a paper presented at the second annual meeting of the American Phytopathological Society, Minneapolis, Minn., Dec. 28-30, 1910.

- MELLISH, HENRY. (1365)
SOME RELATIONS OF METEOROLOGY WITH AGRICULTURE. *Quart. Jour. Roy. Met. Soc.* 36: 77-92. Apr., 1910.
Contains an interesting summary of recent work in the field.
- MENCACCI, MARIO. (1366)
ALCUNE OSSERVAZIONI INTORNO AI DANNI PRODOTTI DAI FREDDI TARDIVI SUL FRUMENTO NELL'AGRO ROMANO. *Ann. Tec. Agr.* 1-2 (fasc. 5): 533-544. July 1, 1929.
The damage done to vegetation by late cold spells is discussed.
- MENGEL, O. (1367)
ÉVOLUTION DU MILDEW SUIVANT LES CONDITIONS DE MILIEU. *Compt. Rend. Acad. Sci. [Paris]* 157: 292-294. 1913.
The effect of weather conditions on the development of mildew is indicated.
- MENOR, PAULINO C. (1368)
THE EFFECT OF CLIMATE UPON THE PRODUCTION OF CORN. (Abstract) *Philippine Agr.* 16: 109-110, July, 1927; and in *Expt. Sta. Rec.* 57: 612. Nov., 1927.
According to the former abstract this is a thesis prepared for the College of Agriculture of the University of the Philippines, 1926, and is listed as experiment station contribution No. 454. It contains the results of a study of the effect of rainfall, temperature, wind velocity, evaporation, and insolation on the production of corn.
- MERCURI, S. (1369)
BASSE TEMPERATURE ED INFEZIONI DI ROGNA NEGLI OLIVI. *Lavoro Ital. Agr.* 2 (34): 4. Aug. 19, 1928.
The effect of cold on olive scab is discussed. It is found to be difficult to establish the temperature at which the olive freezes.
- MERKENSCHLAGER, FRITZ. (1370)
DER FROST ALS MOTOR UND WÜRGER DES PFLANZENLEBENS. *Umschau* 30: 285-287. Apr. 10, 1926.
A discussion of the effect of frost on germination.
- MERTZ, W. M. (1371)
ZUR PHYSIOGNOMIK TROCKENHEITSLIEBENDER KULTURPFLANZEN. *Ernähr. Pflanze* 23 (3): 37-38. Feb. 1, 1927.
A study of the water requirements of buckwheat.
- MERTZ, W. M. (1372)
CONTROL FACTORS OF WINDBURNING OF CITRUS TREES. SERIOUS CONDITION CAN BE ALTERED BY GIVING PROPER ATTENTION TO MOISTURE CONTENT AND HANDLING OF SOIL, AND OTHER CONTRIBUTING CAUSES. *Citrus Leaves* 4 (2): 1-4. Feb., 1924.
- MERTZ, W. M. (1373)
WINDBURNING OF CITRUS TREES. *Calif. Citrogr.* 9: 85, 101, 103-105. Jan. 1924.
- METEOROLOGICAL OBSERVATION IN RELATION TO AGRICULTURE. Irish Free State Dept. Lands and Agr. Jour. 10: 735-745. July, 1910. (1374)
The weather services of various countries are briefly described, and the relation of meteorological observations to agriculture is pointed out.
- MEYER, BERNARD S. (1375)
SEASONAL VARIATIONS IN THE PHYSICAL AND CHEMICAL PROPERTIES OF THE LEAVES OF THE PITCH PINE, WITH ESPECIAL REFERENCE TO COLD RESISTANCE. *Amer. Jour. Bot.* 15: 449-472. Oct., 1928.
This paper reports the results of an investigation upon the seasonal variations in the physical and chemical properties of the leaves of the pitch pine, with regard to water content of the leaves, the sugar content of the leaves, etc.
- MEYER, FRITZ J. (1376)
DIE LICHTPHYSIOLOGIE DER PFLANZEN. *Naturwissenschaften* 8: 842-851. Oct. 22, 1920.
The effect of light on plants is discussed.
- MEZ, CARL. (1377)
NEUE UNTERSUCHUNGEN ÜBER DAS ERFRIEREN EISBESTÄNDIGER PFLANZEN. *Flora* 94: 89-123. Dec. 5, 1904.
The author holds that protoplasm is directly susceptible to cold and that there is for each cell a fatal minimum temperature.

- MIDGLEY, A. R. (1378)
EFFECT OF ALTERNATE FREEZING AND THAWING ON THE IMPERMEABILITY OF ALFALFA AND DODDER SEEDS. *Jour. Amer. Soc. Agron.* 18: 1087-1098. Dec., 1926.
In the case of alfalfa seeds "the first freezing is by far the most effective . . . The intensity of freezing has no influence in reducing the impermeability . . . The duration of freezing seems to have no influence on germination . . . Alternate freezing and thawing has very little or no influence in reducing the number of impermeable dodder seeds."
- MIEHE, HUGO. (1379)
DER RHYTHMUS IM LEBEN DER PFLANZE. *Naturw. Wehnschr. (N. F.)* 21: 385-393. July 9, 1922.
The part played by the weather in plant periodicity is discussed.
- MIELKE, JOHANNES. (1380)
DIE TEMPERATURSCHWANKUNGEN 1870-1910 IN IHREM VERHÄLTNIS ZU DER 11 JÄHRIGEN SONNENFLECKENPERIODE. *Arch. Deut. Seewarte Jahrg.* 36, no. 3, 63 p. 1913.
The relation of sunspots to temperature is discussed.
- MIGHELL, RONALD L., and ROWE, HAROLD B. (1381)
RELATION OF WEATHER TO THE QUALITY AND PRICE OF MASSACHUSETTS ONIONS. *Jour. Farm Econ.* 12: 338-340. Apr., 1930.
A study of the relation between observed variation in prices and rainfall, temperature, and proportion of bright sunshine during a number of years, the data used being prices of onions, estimates of onion production, and weather data from the Amherst weather station. It is shown that "a large part of the variations in prices not related to production is caused by differences in quality, and that these variations may be estimated from weather data."
- MILHAM, WILLIS I. (1382)
A TWO YEARS' STUDY OF SPRING FROSTS AT WILLIAMSTOWN, MASS. *U. S. Mo. Weather Rev.* 36: 250-254. August, 1908.
A critical study is made of the spring frosts at Williamstown in 1907 and 1908 with a view to forming conclusions in regard to the prediction of the probable minimum temperature from observations of weather conditions made during the previous afternoon, and the variation in the severity of frost at different places within a small area and at different distances above ground. The spring frosts are "the ones which do the damage to the growing vegetation."
- MILLER, EDWIN C. (1383)
FACTORS IN DROUTH RESISTANCE. *Breeder's Gaz.* 70 (15-1820: 649-650. Oct. 12, 1916.
The results are given of a series of investigations to determine some of the characters which enable the sorghums to withstand severe climatic conditions better than corn.
- and SAUNDERS, A. R. (1384)
SOME OBSERVATIONS ON THE TEMPERATURE OF THE LEAVES OF CROP PLANTS. *Jour. Agr. Research* 26: 15-43. Oct. 6, 1923.
A study is made of the relation of leaf temperature to the rate of transpiration, leaf temperatures during the day and night, temperature of different portions of the leaf under like conditions, and the temperature of leaves in direct and in diffuse light.
- MILLER, JULIAN C. (1385)
EFFECT OF HIGH TEMPERATURE ON CHARACTER OF GROWTH OF CABBAGE. *Plant Physiol.* 3: 95-96. Jan., 1928.
A brief account of a study begun in October, 1925.
- (1386)
A STUDY OF SOME FACTORS AFFECTING SEED-STALK DEVELOPMENT IN CABBAGE. 46 p. Ithaca, 1929. (N. Y. Cornell Agr. Expt. Sta. Bul. 488.)
This is a study of the effect of length of day and time of planting on cabbage stalk development.
- MILLER, M. (1387)
THE EFFECT OF A VARYING MOISTURE SUPPLY UPON THE DEVELOPMENT AND COMPOSITION OF THE MAIZE PLANT AT DIFFERENT PERIODS OF GROWTH. 36 p. Columbia, 1925. (Missouri Agr. Expt. Sta. Research Bul. 76.)
- MINERBI, GIUSEPPE. (1388)
EFFETTI DELLA BRINATA TARDIVA SUL FRUMENTO. *Gior. Agr. della Domenica* 37 (23): 206. June 5, 1927.
The effect of late rime on wheat is described.

MISNER, E. G. (1389)
CORN-BELT RAINFALL AND THE PRODUCTION AND PRICE OF CORN. 4 p. [n. p. 1926?] [Mimeographed.]

(1390)
PRICES OF LONG ISLAND POTATOES. N. Y. Agr. Col. (Cornell), Dept. Agr. Econ. and Farm Management, Farm Econ. 17: 159-164. Aug. 22, 1924.
The relation of rainfall to the price of Long Island potatoes is shown from 1893 to 1922.

(1391)
PRODUCTION AND PRICES OF CABBAGE. N. Y. Agr. Col. (Cornell) Dept. Agr. Econ. and Farm Management, Farm Econ. 16: 149-152. July 19, 1924.
The relation of July, August, and September rainfall is shown to yield and price of cabbage in New York State.

(1392)
RAINFALL AND ALTERNATE BEARING HABITS AS FACTORS AFFECTING THE PRODUCTION AND PRICE OF APPLES. N. Y. Col. Agr. (Cornell), Dept. Agr. Econ. and Farm Management, Farm Econ. 24: 270-272. May 6, 1925.
A paragraph deals with the effect of frost and freeze injury on the apple crop.

(1393)
RELATION OF CORN-BELT RAINFALL TO THE PRODUCTION AND PRICE OF CORN. N. Y. Col. Agr. (Cornell), Dept. Agr. Econ. and Farm Management, Farm Econ. 35: 493-495. June, 1926.
"The very close relation between rainfall and corn production and prices makes it possible to forecast the United States corn crop in the first week in September within 7 per cent of the final estimate of production. An approximation of price can also be made directly from the rainfall data."

(1394)
RELATION OF RAINFALL IN NEW YORK TO THE PRODUCTION AND PRICE OF HAY. N. Y. Agr. Col. (Cornell), Dept. Agr. Econ. and Farm Management, Farm Econ. 35: 495-497. June, 1926.
"The amount of rain that falls in April, May, and June largely determines the yield per acre of hay in New York and the price of hay on farms and in the city."

(1395)
RELATION OF RAINFALL TO THE PRODUCTION AND PRICE OF OATS. N. Y. Col. Agr. (Cornell), Dept. Agr. Econ. and Farm Management, Farm Econ. 39: 539, 545-547. Nov., 1926.

(1396)
RELATION OF RAINFALL TO YIELDS OF CANNING FACTORY PEAS AND TOMATOES. N. Y. Col. Agr. (Cornell), Dept. Agr. Econ. and Farm Management, Farm Econ. 25: 289-290. June 10, 1925.

(1397)
STUDIES OF THE RELATION OF WEATHER TO THE PRODUCTION AND PRICE OF FARM PRODUCTS. I. CORN. 192 p. [Ithaca, N. Y.], 1928. [Mimeographed.]
"Precipitation, temperature, and length of the growing season are the most important of the climatological factors determining the yield of corn per acre." The relation of weather conditions to the merchantability of the corn crop, its price, and purchasing power is also discussed. Tables and graphs are used in illustration.

(1398)
WEATHER—ITS RELATION TO THE PRODUCTION AND PRICE OF FARM PRODUCTS. 40 p. [Ithaca, N. Y., 1929.] [Mimeographed.]
The author discusses briefly the relation of rainfall and temperature to yield and price of corn, and of rainfall to yield and price of cabbage, cotton, potatoes, hay, and oats. "The annual variations in apple production and price are due largely to rainfall, biennial bearing habits, and frost and freeze injury."

MITCHELL, ALEXANDER J. (1399)
EFFECTS OF LOW TEMPERATURES ON CITRUS TREES AND FRUITS. U. S. Mo. Weather Rev. 38: 16-17. Jan., 1910.

"At the usual rate of fall of the temperature during cold waves the danger point to citrus fruits is generally reached in about 5 or 6 hours after the air temperature has reached the freezing point. Often, however, owing to diminished wind movement and strong outward radiation, the most serious injury to citrus fruits occurs on the second night of the cold wave."

- MITCHELL, ALEXANDER J.—Continued. (1400)
FROST AND FROST PROTECTION IN FLORIDA. U. S. Mo. Weather Rev. 42: 588-589.
Oct., 1914.
- MITCHELL, WESLEY C. (1401)
BUSINESS CYCLES; THE PROBLEM AND ITS SETTING. 489 p. New York,
National bureau of economic research (Inc.), 1927. (Natl. Bur. Econ.
Research Pubs. 10.)
Reference is made to various theories which attribute business cycles
to the influence of weather conditions on crops. p. 12-16, 50.
- Mix, A. J. (1402)
THE FORMATION OF PARENCHYMA WOOD FOLLOWING WINTER INJURY TO THE
CAMBIUM. *Phytopathology* 6: 279-283. June, 1916.
"The writer has observed the formation of parenchyma wood in two
cases, in which it followed what was, apparently, an injury to the
cambium due to freezing while in the rest condition." The trees observed
in both cases were apple trees.
- SUN-SCALD OF FRUIT TREES; A TYPE OF WINTER INJURY. p. 237-284. Ithaca,
1916. (N. Y. Cornell Agr. Expt. Sta. Bul. 382.)
"Sun scald, an injury sometimes occurring to bark, cambium, and
outer sapwood on the southwest side of tree trunks, particularly of apple
trees, is probably a winter injury caused by direct freezing to death
of the tissue. This freezing to death is, it is believed, made possible by
a rapid temperature fall consequent to warming up of the tissue above
freezing by the rays of the sun on a bright, cold day in late winter."
- MIYAKÉ, KIICHI. (1404)
ON THE STARCH OF EVERGREEN LEAVES AND ITS RELATION TO PHOTOSYNTHESIS
DURING THE WINTER. *Bot. Gaz.* 33: 321-340. May, 1902.
The starch content of evergreen leaves in Japan in winter is studied.
Conditions are compared with those in Europe.
- MOCHKOV, B. S. (1405)
ON THE QUESTION OF PHOTOPERIODISM OF CERTAIN WOODY SPECIES. *Trudy*
Prikl. Bot. i Selekt. (Bul. Appl. Bot. and Plant Breeding), 23: 479-510.
1930.
In Russian, with English summary, p. 510.
An account of the effect of length of day on the growth and morphology
of certain trees.
- MOE, ASCHE. (1406)
DATES OF FLOWERING FOR NATIVE AND GARDEN PLANTS AT STAVANGER 1897-1926.
Norske Vidensk. Akad., Oslo. I. Mat. Naturv. Kl. no. 3. 49 p. 1928.
Reviewed in *Quart. Jour. Roy. Met. Soc.* [London] 55: 213-214. Apr.,
1929.
"Such a monumental work, apart from its local values for farm and
garden, is of prime scientific value. For it greatly extends the means
of studying the relative effects of diverse weather conditions from region
to region and from plant to plant."
- MÖBIUS, MARTIN A. J. (1407)
DIE ERKÄLTUNG DER PFLANZEN. *Ber. Deut. Bot. Gesell.* 25: 67-70. Mar. 25,
1907.
The effect of cold on plants is discussed.
- MOLISCH, HANS. (1408)
DAS EINFRIEREN DER PFLANZEN. *Schr. Ver. Verb. Naturw. Kenntnisse Wien* 51:
141-176. 1910-11.
The effect of low temperatures on plants is discussed.
- MOLOZEV, A. I. (1409)
THE INFLUENCE OF TEMPERATURE AND LIGHT ON THE DATE OF FLOWERING.
Trudy Prikl. Bot. i Selekt. (Bul. Appl. Bot. and Plant Breeding) 22:
277-372. 1929.
In Russian. English summary, p. 369-372.
- MOLZ, EMIL. (1410)
UNTERSUCHUNGEN ÜBER DIE IM VERGANGENEN WINTER AN DEN REBEN AUF-
GETRETENEN FROSTSCHÄDEN. *Ber. Lehr-u. Forschungsanst. Wein. Obst.*
u. Gartenbau Geisenheim, 1907: 313-314.
A brief account of frost damage to vines.
- MONTETH, JOHN, jr. (1411)
WINTER INJURY OF TURF. U. S. Golf Assoc., Green Sect. Bul. 7: 62-76.
Apr., 1927.

MONTESUS DE BALLORE, R. DE. (1412)

SUR LA NON-CORRÉLATION EN FRANCE ENTRE LES PLUIES ET LES RÉCOLTES.
Météorologie (n. s.) 2: 412-414. Sept., 1926.

The author discusses the relation between rainfall, temperature, and crop yield in France.

MOORE, BARRINGTON. (1413)

INFLUENCE OF CERTAIN SOIL AND LIGHT CONDITIONS ON THE ESTABLISHMENT
OF REPRODUCTION IN NORTHWESTERN CONIFERS. Ecology 7: 191-220. Apr.,
1926.

MOORE, BENJAMIN. (1414)

THE FORMATION OF NITRITES FROM NITRATES IN AQUEOUS SOLUTION BY THE
ACTION OF SUNLIGHT, AND THE ASSIMILATION OF THE NITRATES BY GREEN
LEAVES IN SUNLIGHT. Roy. Soc. [London] Proc., Ser. B 90: 158-167.
June 1, 1918.

MOORE, DON R. (1415)

SUSCEPTIBILITY OF EUCALYPTS TO DROUGHT. Aust. Forest Jour. 6: 171-172.
July, 1923.

MOORE, EMMELINE. (1416)

THE STUDY OF WINTER BUDS WITH REFERENCE TO THEIR GROWTH AND LEAF
CONTENT. Torrey Bot. Club Bul. 36: 117-145. Mar., 1909.

MOORE, HENRY L. (1417)

CROP-CYCLES IN THE UNITED KINGDOM AND IN FRANCE. Jour. Roy. Statis. Soc.
(n. s.) 83 (pt. 3): 445-451. May, 1920.

The author shows that "there are well-defined, approximately syn-
chronous eight years' cycles in the yield per acre of the crops in the
United Kingdom, France, and the United States; that in the United King-
dom and France the eight years' cycle is a compound cycle of eight years
and four years with principal and minor maxima approximately four
years apart; that the periodgrams suggest the possibility of six years'
cycle which, when combined with the compound cycle of eight and four
years, will produce an interference that may, in part, account for the
observed variations in crop cycles."

(1418)

CROP-CYCLES IN THE UNITED KINGDOM AND IN THE UNITED STATES. Jour. Roy.
Statis. Soc. 82 (pt. 3): 373-389. May, 1919.

The author's aim is to point out fundamental agreements between
meteorological, agricultural, and economic cycles, and to furnish evidence
that the crop cycles in the United States tend to synchronize with those
of the United Kingdom.

(1419)

ECONOMIC CYCLES: THEIR LAW AND CAUSE. 149 p. New York, The Macmillan
Co. 1914.

"The fundamental, persistent cause of the cycles in the yield of the
crops is the cyclical movement in the weather conditions represented by
the rhythmically changing amount of rainfall; the cyclical movement in
the yield of crops is the fundamental persistent cause of economic cycles."
p. 149.

(1420)

FORECASTING THE CROPS OF THE DAKOTAS. Polit. Sci. Quart. 35: 204-235.
June, 1920.

Discusses the close relation between meteorological cycles and crop
cycles as illustrated in the crop area of North and South Dakota.

(1421)

FORECASTING THE YIELD AND THE PRICE OF COTTON. 173 p. New York, The
Macmillan Co., 1917.

In chapter 4, Forecasting the Yield of Cotton from Weather Reports,
the author makes the statement that "it is possible, by means of mathe-
matical methods, to make more accurate forecasts than the official
reports, in the matter of the prospective yield per acre of cotton, simply
from the data supplied by the Weather Bureau as to the current records
of rainfall and temperature in the respective cotton States."

(1422)

GENERATING ECONOMIC CYCLES. 141 p. New York, The Macmillan Co.
1923.

"The primary purpose of this Essay is to show that a known natural
cause originates an agricultural cycle which in turn generates other
economic cycles." Introduction, p. 11.

- MOORE, J. G. (1423)
WINTER INJURY TO FRUITS IN WISCONSIN IN 1918. Amer. Soc. Hort. Sci. Proc. 1918: 31-32.
- MOORE, PHYLLIS. (1424)
EFFECTS OF SUDDEN SEVERE FROST ON MARCH 13. Gard. Chron. (3) 83:250. Apr. 7, 1928.
- MORADO, EMILIO K. (1425)
THE EFFECT OF SUNLIGHT ON THE GERMINATION OF PAPAYA SEEDS, CARICA PAPAYA. Philippine Agr. Rev. 17 (1, first quarter): 21-23. 1924.
Too much sunlight and the absence of sunlight are both detrimental to seeds. Seeds need sunlight for one-half day, preferably from 7 to 11.30 a. m., and then partial shade.
- MORE ON WINTER INJURY TO PEACHES AND OTHER FRUITS. U. S. Dept. Agr., Bur. Plant Indus. Plant Disease Repr. 14 (7): 62-65. April 1, 1930 [Mimeographed.] (1426)
- MOREAU, FERNAND, AND DUSSEAU, A. (1427)
L'ÉTUDE DE LA RÉISTANCE DES BLÉS AU FROID. Rev. Bot. Appl. et Agr. Colon. 8: 482-488. July, 1928.
Cold resistance in wheat is studied.
- and DUSSEAU, A. (1428)
LES MÉTHODES D'ÉTUDES DE LA RÉISTANCE DU BLÉ AU FROID. Jour. Agr. Prat. 50: 276-280. Oct. 6, 1928.
Not seen.
- MORELAND, W. H. (1429)
THE RELATION OF THE WEATHER TO RUST ON CEREALS. India Dept. Agr. Mem. Bot. Ser. 1 (2): 53-58. July, 1906.
A study of the effect of weather conditions on rust on cereals in India shows that the deciding factor is the humidity in January and February.
- MOREUX, TH. (1430)
SUR L'ACTIVITÉ SOLAIRE ET CERTAINS PHÉNOMÈNES. Compt. Rend. Acad. Sci. [Paris], 184: 1090-1091. 1927.
The author notes correlation between solar activity as manifested by sunspots and wheat production in France.
- MORI, NAÔZÔ. (1431)
ON THE RELATION OF RICE CROPS IN OKAYAMA PREFECTURE AND THE SUNSPOTS VARIATION. Met. Soc. Japan Jour [ii] 3: 25-39. 1925. In Japanese.
Abstract in Japan Jour. Astron. and Geophysics (Abs.) 3 (3): 26. 1926.
"The author compared the record of rice crops in Okayama Prefecture for 37 years, beginning in 1887 and ending in 1923, with that of the sun spots activity in the same period expressed by the annual sum of the total sun spots area." He finds that "the crop decreases in the first and fourth year after the appearance of the sun-spot minimum and increases gradually in the second and third year. The amount of decrease was 20 per cent of the average value in the worst case."
- MORINAGA, TOSHITARO. (1432)
EFFECT OF ALTERNATING TEMPERATURES UPON THE GERMINATION OF SEEDS. Amer. Jour. Bot. 13: 141-158. Feb., 1926.
This study includes certain "extensions of previous work done on the effect of alternating temperatures upon the germination of seeds."
- MORRIS, OSCAR M. (1433)
THE PART TEMPERATURE PLAYS IN FRUIT GROWING. Better Fruit 18 (9): 12-13, 26-28. Mar., 1924.
Temperature, humidity, and sunlight are considered.
- (1434)
WINTER INJURY OF FRUIT TREES. West. Fruit 6 (3): 3-4, 23. Mar., 1924.
- (1435)
WINTER INJURY OF FRUIT TREES. Wash. State Hort. Assoc. Proc. Ann. Meeting 11: 38-42. Dec., 1914.
- (1436)
WINTER INJURY OF FRUIT TREES MORE COMMON IN NORTHWEST. Better Fruit 10 (6): 19-21. Dec., 1915.
- (1437)
WINTER INJURY TO FRUIT TREES. Wash. State Hort. Assoc. Proc. Ann. Meeting 16: 15-21. Dec., 1920.

- MOSIER, J. G. (1438)
CLIMATE OF ILLINOIS. 125 p. Urbana, 1918. (Ill. Agr. Expt. Sta. Bul. 208.)
The relation of rainfall and temperature to the growth of crops in Illinois is discussed.
- MOTTET, SERAPHIM. (1439)
DE L'INFLUENCE DE L'HUMIDITÉ ATMOSPHÉRIQUE SUR LA VÉGÉTATION. Rev. Hort. 73: 38-39. Jan. 16, 1901.
The author gives the results of some observations on the influence of atmospheric humidity on the growth of plants. (1440)
L'INFLUENCE DE L'HUMIDITÉ ATMOSPHÉRIQUE SUR LA VÉGÉTATION. Rev. Hort. 97: 500-502. Aug. 16, 1925.
A brief account of the influence of atmospheric humidity on plants.
- MOULTON, ROBERT H. (1441)
PUT YOUR PLANTS TO BED EARLIER. Independent 102: 294. May 29, 1920.
"It is possible for plants to have too much daylight, or rather too many hours of daylight in comparison with the number of hours of darkness."
- MÜLLER, GERTRUD. (1442)
UNTERSUCHUNGEN ÜBER DIE VON WEIZENSAMEN UND WEIZENKEIMLINGEN ERTRAGENEN HÖCHSTEN TEMPERATUREN. Ztschr. Pflanzenkrank. 23: 193-198. 1913.
Abstract in Expt. Sta. Rec. 29: 731. Dec., 1913.
"The author gives the tabulated results as to capacity for germination and growth obtained by her from numerous treatments of seed wheat by combining through considerable ranges the factors of temperature, moisture, and time."
- MÜLLER-THURGAU, HERMANN. (1443)
SONNENBRANDSCHÄDEN BEI KERNOBSTRÜCHTEN. Landw. Jahrb. Schweiz 36: 814-815. 1922.
Damage to kernel fruit from sun burning.
- MÜNCH, ERNST. (1444)
FROSTGEFÄHRDUNG WINTERGRÜNER GEHÖLZE. Mitt. Deut. Dendrol. Gesell. 40: 175-184. 1928.
Winter injury to evergreen trees is discussed.
and Liske, F. (1445)
DIE FROSTGEFÄHRDUNG DER FICHTE IN SACHSEN. Tharandter Forstl. Jahrb. 77: 97-115, 129-148. 1926.
Not seen.
- MÜNTZ, A. (1446)
LA LUMINOSITÉ ET L'ASSIMILATION VÉGÉTALE. Compt. Rend. Acad. Sci. [Paris] 156: 368-370. Feb. 3, 1913.
The author finds that plant assimilation is not limited by light intensity, which explains the occurrence of abundant harvests both in cloudy and in sunny years.
- MÜNZINGER, A. (1447)
DAS KLIMA IN LANDWIRTSCHAFTLICHER BEZIEHUNG. Handbuch der Landwirtschaft, hrsg. von Fr. Aereboe . . . , Bd. 2, no. 3, p. 95-137. 1928.
The influence of temperature, rainfall, light, wind, thunder, and hail on plant life and growth is discussed.
- MUKERJEE, RADHA K. (1447a)
AGRICULTURAL CYCLES AND SUNSPOTS. Indian Jour. Econ. 10 (pt. 2): 259-299. (ser. 37). Oct., 1929.
"No factor is more important in Indian agriculture than the amount and distribution of rainfall . . . The date of sunspot minima are approximately synchronous with the minima of the crop cycles . . . are also approximately synchronous with the cycles in Indian weighted Index numbers from 1861 to 1918."
- MUNERATI, OTTAVIO. (1448)
LE BASSE TEMPERATURE AL MOMENTO DELLA GERMINAZIONE FANNO SFUGGIRE IL GRANO ALL'ATTACCO DELLA CARIE? Atti R. Accad. Naz. Lincei, Rend. Cl. Sci. Fis., Mat. e Nat., Anno 40, ser. 5, v. 32, fasc. 6, p. 285-289. 1923.
An investigation of the effect of low temperature on seed germination.

MUNERATI, OTTAVIO—Continued.

(1449)

L'INFLUENZA DELLE BASSE TEMPERATURE SULLA GERMINAZIONE DEL FRUMENTO APPENA RACCOLTO E DEI SEMI COSÌ DETTI FRESCI. Atti. Accad. Naz. Lincei (5) 29: 273-275. 1920.

The author shows that seeds of wheat will germinate immediately after harvesting at a low temperature.

(1450)

POSSIBILITÉ DE DÉTERMINER L'ÂGE DES GRAINES DE BLÉ PAR LA TEMPÉRATURE DE LEUR GERMINATION. Compt. Rend. Acad. Sci. [Paris] 182: 535-537. Feb. 22, 1926.

On the possibility of determining the age of seeds of wheat from the temperature at which they germinate.

— and ZAPPAROLI, T. V.

(1451)

L'ALTERNANZA DELLA UMIDITÀ E DELLA SICCITÀ SULLA GERMINAZIONE DEI SEMI DELLE PIANTE SPONTANEE. Sta. Sper. Agr. Ital. 46: 157-195. 1913.

A study of the effect of alternating periods of humidity and drought on seed germination.

MUNGER, THORNTON T.

(1452)

PARCH BLIGHT ON DOUGLAS FIR IN THE PACIFIC NORTHWEST. Plant World 19: 46-47. Feb., 1916.

The blight is due to the Chinook winds.

MUNNS, E. N.

(1453)

HIGH TEMPERATURES AND EUCALYPTS. Jour. Forestry 19: 25-33. Jan., 1921.

"Eucalypts can better withstand untoward conditions if they are planted in loamy soils or where the trees are able to reach the permanent ground water or water table. Under these latter circumstances, there is, perhaps, no species that is unable to withstand long-continued drought or untoward evaporation conditions."

(1454)

RELATIVE FROST RESISTANCE OF EUCALYPTUS IN SOUTHERN CALIFORNIA. Jour. Forestry 16: 412-428. Apr., 1918.

The author gives the result of detailed observations of different species of eucalyptus trees with regard to their resistance to frost and suggests methods for their protection.

MURINOFF, A.

(1455)

EINFLUSS DES LICHTES UND DER FEUCHTIGKEIT AUF DIE ZUSAMMENSETZUNG DER PFLANZEN. Ber. Deut. Bot. Gesell. 25: 507-509. 1907.

The results are given of experiments made to determine the effect of light and moisture upon *Vicia faba* and wheat.

MUSBACH, F. L., and KING, M. L.

(1456)

THE WEATHER AS A FACTOR IN CROP PRODUCTION. Jour. Amer. Soc. Agron. 16: 381-383. June, 1924.

This is a brief account of the effect of temperature and rainfall on the yield of corn at the Spooner Branch Experiment Station in Wisconsin in 1918, 1919, and 1920.

MUSSET, R.

(1457)

LE DOMAINE DU PALMIER-DATTIER ET SES EXIGENCES CLIMATIQUES. Ann. Géogr. 36: 24-32. Jan. 15, 1927.

The author discusses the effect of rainfall, temperature, and light on the growth of the date palm.

NAEGLER, W.

(1458)

EINFLUSS DER WITTERUNGS-ERSCHEINUNGEN AUF DIE ERTRÄGE UNSLÄRER KULTURPFLANZEN. Deut. Landw. Presse 55: 94-95. Feb. 18, 1928.

A brief review of recent literature on the influence of weather on crops.

NAKASHIMA, HIROKICHI.

(1459)

ÜBER DEN EINFLUSS METEOROLOGISCHER FAKTOREN AUF DEN BAUMZUWACHS (1) ÜBER DEN EINFLUSS AUF DEN STAMMUMFANG EINES TANNENBAUMES. Jour. Col. Agr., Hokkaido Imp. Univ. 12 (pt. 2): 69-263. Nov., 1924.

The influence of temperature and rainfall on tree growth, and particularly on the growth of the fir is studied.

NASH, GEORGE V.

(1460)

EFFECT OF THE PAST WINTER ON SHRUBS. Jour. N. Y. Bot. Gard. 5: 136-151. July, 1904.

(1461)

INJURY TO EVERGREENS. Jour. N. Y. Bot. Gard. 17: 179-185, Oct., 1916; 19: 48-50, 159-164. 1918.

- NASH, GEORGE V.—Continued. (1462)
WINTER KILLING OF EVERGREENS. Jour. N. Y. Bot. Gard. 13: 110-120. July, 1912.
- NAUMANN, ARNO. (1463)
EIGENARTIGE FROSTSCHÄDIGUNGEN AN APFELFRÜCHTEN. 4 p. Dresden, C. Heinrich. 1911. (Reprint from Ztschr. Obst. u. Gartenbau no. 2.)
Frost damage to apples. (1464)
EINIGE KRANKHEITEN GÄRTNERISCHER KULTURGEWÄCHSE UND EIGENARTIGE FROSTSCHÄDIGUNGEN AN APFELFRÜCHTEN. Jahresber. Ver. Angew. Bot. 9: 198-217. 1911.
Frost damage to apples is discussed. (1465)
NEGER, FRANZ W. (1466)
RAUCHWIRKUNG, SPÄTFROST UND FROSTTROCKNIS UND IHRE DIAGNOSTIK. Tharandter Forstl. Jahrb. 66: 195-212. 1915.
The author discusses frost injury to conifers and its diagnosis. (1467)
NÉGRIER, AUGUSTE. (1468)
TAILLE DES VIGNES GELÉES. Rev. Vitic. 54: 315-316. Apr. 28, 1921.
A brief account of the effect of frost on vines. (1469)
NEILSON, J. A. (1470)
WINTER INJURY AMONG FRUIT TREES. Ontario Fruit Growers' Assoc. Ann. Rpt. 50: 41-48. 1918. (1471)
NEMEC, ANTONIN, AND GRACANIN, MIHOVIL. (1472)
INFLUENCE DE LA LUMIÈRE SUR L'ABSORPTION DE L'ACIDE PHOSPHORIQUE ET DU POTASSIUM PAR LES PLANTES. Compt. Rend. Acad. Sci. [Paris] 182: 806-808. Mar. 22, 1926.
Experiments show that young rye plants developed in full daylight are richer in mineral matter than those exposed to colored light. (1473)
NEUBERGER, F. (1474)
THE RESISTANCE OF LEGUMINOUS SEEDS TO HIGH TEMPERATURES. Kiszlet. Kőzlem. 17: 121-168. Jan.-Feb., 1914.
In Hungarian. German abstract p. 169-170.
Abstract in Internatl. Inst. Agr. [Rome] Mo. Bul. Agr. Intell. and Plant Diseases 5: 745. June, 1914.
The effect of heat on the germination of leguminous seeds is found to be proportional to its intensity and duration. "Immersion in water at a temperature higher than the maximum temperature of germination has no injurious effect if the immersion takes place before the seeds begin to swell." (1475)
NEUHAUS, JOSEF. (1476)
DAS BETRIEBSSYSTEM UND DAS KLIMA. "UNTERSUCHUNGEN ÜBER DIE BEZIEHUNGEN ZWISCHEN BETRIEBSSYSTEM UND KLIMA AN BETRIEBEN IN GANZ DEUTSCHLAND." 133 p. Giessen, 1929.
Inaug. Diss. Giessen.
A study of the effect of weather factors on different varieties of crops and on systems of farm management in Germany. (1477)
NEWCOMBE, FREDERICK C. (1478)
LIGHT AS A FORMATIVE FACTOR IN THE HABIT OF GROWTH OF ASPARAGUS PLUMOSUS. Science (n. s.) 33: 190-191. Feb. 3, 1911.
The horizontal bend of Asparagus plumosus is profoundly influenced by the presence of light. (1479)
OPTIMUM TEMPERATURES FOR GROWTH OF SOME GRASS COLEOPTILES. Mich. Acad. Sci., Arts, and Letters, Papers 3: 203-210. 1923. (1480)
NEWMAN, L. H. (1481)
"HARDINESS" IN PLANTS WHICH LIVE IN THE OPEN OVER WINTER. Sci. Agr. 1: 209-212. May, 1921. (1482)
NEWTON, ROBERT. (1483)
COLLOIDAL PROPERTIES OF WINTER-WHEAT PLANTS IN RELATION TO FROST RESISTANCE. Jour. Agr. Sci. [England] 14: 178-191. Apr., 1924.
"Certain colloidal properties of winter wheat plants have been found to be closely related to frost resistance, and provide indices of hardiness which may have practical application in the breeding and selection of hardy varieties." (1484)
A COMPARATIVE STUDY OF WINTER-WHEAT VARIETIES WITH ESPECIAL REFERENCE TO WINTER-KILLING. Jour. Agr. Sci. [England] 12: 1-19. Jan., 1922.

NEWTON, ROBERT—Continued.

"The discussion indicates that we are still far from an exact analysis of the factors influencing winter hardiness, but certain of the observations, notably the failure of freezing the tissues to break down the protoplasmic structure of the hardened plants, are very suggestive."

(1475)

THE NATURE AND PRACTICAL MEASUREMENT OF FROST RESISTANCE IN WINTER WHEAT. 53 p. Alberta, 1924. (Alberta Univ. Col. Agr. Research Bul. 1.)

"A study has been made of the factors determining frost resistance in winter wheat, and of methods for the measurement of this quality which may have practical application in the breeding and selection of hardy varieties."

— and BROWN, W. R.

(1476)

IS THE APPARENT WINTER-KILLING OF SWEET CLOVER AND RED CLOVER A RESULT OF DISEASE INJURY? *Sci. Agr.* 5: 93-96. Nov., 1924.

Experiments described seem to indicate that "the injury to sweet-clover, which had been supposed to be winter-killing, is due in fact to infection by *sclerotinia* . . . For red clover, on the other hand, the figures are entirely negative."

— and BROWN, W. R.

(1477)

SEASONAL CHANGES IN THE COMPOSITION OF WINTER WHEAT PLANTS, IN RELATION TO FROST RESISTANCE. *Jour. Agr. Sci. [England]* 16: 522-538. Oct., 1926.

"The adaptation of plants to resist frost appears to depend on seasonal changes which give the protoplasm stability. A study has been made of the changes occurring in winter-wheat plants, of varieties differing widely in winter hardiness, during the fall and winter months."

NICHIPOROVICH, A. A.

(1478)

INQUIRY INTO THE CAUSE OF DROUGHT RESISTANCE IN SOME PLANTS. *Jour. Landw. Wiss.* 3: 341-458. 1926.

In Russian, with English summary.

NICHOLS, CARL.

(1479)

THE SCIENCE OF ORCHARD HEATING. *Amer. Soc. Hort. Sci. Proc.* 1915: 22-27.

A brief review of the development of frost protection devices.

NIETHAMMER, ANNELIESE.

(1480)

ZUR FRAGE DES LICHTTREIBENS. *Biochem. Ztschr.* 177: 418-433. Oct. 18, 1926.

The sensitiveness to light of winter buds is studied.

NIGHTINGALE, G. T.

(1481)

THE CHEMICAL COMPOSITION OF PLANTS IN RELATION TO PHOTOPERIODIC CHANGES. 68 p. Madison, 1927. (*Wis. Agr. Expt. Sta. Research Bul.* 74.)

(1482)

LIGHT IN RELATION TO THE GROWTH AND CHEMICAL COMPOSITION OF SOME HORTICULTURAL PLANTS. *Amer. Soc. Hort. Sci. Proc.* 1922: 18-29.

"It is the purpose of this paper to outline some of the growth conditions and associated chemical changes within plants, when exposed for various lengths of time to light."

— and SCHERMERHORN, L. G.

(1483)

NITRATE ASSIMILATION BY ASPARAGUS IN THE ABSENCE OF LIGHT. 24 p. New Brunswick, 1928. (*N. J. Agr. Expt. Sta. Bul.* 476.)

"The object of this investigation was to determine whether the asparagus plant can transform nitrates to organic nitrogen in the absence of sunlight and whether nitrates applied under such conditions will modify the yield of spears."

NILSSON-EHLE, HERMAN.

(1484)

SAMMANSTÄLLNING AF RESULTATEN FRÅN UTSÄDESFÖRENINGENS HITILLS UTFÖRDA JEMFÖRANDE FÖRSÖK MED OLIKA HÖSTHVETESORTER. *Sveriges Utsädesför. Tidskr.* 16: 189-308. 1906.

Gives data on winter hardiness of wheat tested at Svalof and Ultuna in Sweden from 1887 to 1906.

(1485)

DE SENASTE RESULTATEN AF HÖSTHVETEFÖRÄDLINGEN PÅ SVALÖF. *Sveriges Utsädesför. Tidskr.* 25: 4-22. 1915.

Abstract *Internatl. Rev. Sci. and Pract. Agr.* [Rome] 7: 354-357. Mar., 1916.

NILSSON-EHLE, HERMAN—Continued.

"The writer reviews the work of the past six years on the improvement of wheat in Sweden. It seems to be a question of the extent to which the characters 'yield' and 'resistance to cold' can be combined in the same strain."

(1486)

ZUR KENNTNIS DER ERBLICHKEITSVERHÄLTNISSE DER EIGENSCHAFT WINTERFESTIGKEIT BEIM WEIZEN. Ztschr. Pflanzenzücht. 1 (Hft. 1): 3-12. Dec., 1912.

The author discusses the conditions under which winter hardiness in wheat is inherited.

NILSSON-LEISSNER, GUNNAR.

(1487)

DEATH FROM LOW TEMPERATURE AND RESISTANCE OF PLANTS TO COLD. Quart. Rev. Biol. 4: 113-117. Mar., 1929.

NISHIKADO, YOSHIKAZU.

(1488)

EFFECT OF TEMPERATURE ON THE GROWTH OF HELMINTHOSPORIUM ORYZAE BR. D. HAAN. Ann. Phytopath. Soc. Japan 1 (5): 20-30. 1923.

Japanese, with English summary.

NIXON, R. L.

(1489)

WEATHER DAMAGE TO COTTON. 14 p. Washington, D. C., 1926. (U. S. Dept. Agr. Bul. 1438.)

The damage discussed is principally to baled cotton.

NOACK, FRITZ.

(1490)

ÜBER FROSTBLASEN UND IHRE ENTSTEHUNG. Ztschr. Pflanzenkrank. 15 (Hft. 1): 29-43. Feb. 28, 1905. (Note by Sorauer, p. 43-44.)

Damage to plants by frost is studied.

NOGUCHI, YAKICHI.

(1491)

PHOTOPERIODISM IN RELATION TO RICE BREEDING. Nōgaku Kwaihō Jour. Sci. Agr. Soc. no. 299, p. 487-500. Oct. 5, 1927.

In Japanese, English summary, p. 499-500.

The author finds that shortening the period of daylight hastens the flowering of the rice plant, while normal daylight with electric light at night inhibits flowering.

NOMBLOT.

(1492)

LES EFFETS DE LA SÉCHERESSE DE 1928 SUR LA RÉCOLTE FRUITIÈRE ET LES ARBRES FRUITIERS. Compt. Rend. Acad. Agr. France 14: 1129-1130. Nov. 21, 1928.

A brief note on the effect of the drought of 1928 on the fruit yield.

NOMBLOT-BRUNEAU.

(1493)

OBSERVATIONS SUR LES VÉGÉTATIONS DIURNE ET NOCTURNE COMPARÉES. Jour. Soc. Natl. Hort. France (4) 10: 350-352. June, 1909.

Observations made on the rate of growth of scions of different varieties of pears grafted on their own stock and on quinces show that there is very little difference between growth at night and during the day. Other things being equal, the maximum growth takes place during moist, warm, stormy weather.

NOETON, JOHN B. S.

(1494)

CROWN SWELLING DISEASE OF PEACH. Phytopathology 1: 53-54. Apr., 1911.

The author attributes an outbreak of this disease in Maryland either to "some injury to the roots before planting or [to] the unusually wet spring of 1908, followed by extreme drouth."

NOTES ON SHADE TREES.

(1495)

Uganda Planters' Assoc. Year Book 1921-22: 84-85.

The advantages of shade to coffee are outlined, and a list is given of the kinds of shade trees that have been tried.

NOUGARET, R. L.

(1496)

A PROPOSED TREATMENT FOR FROSTED GRAPEVINES. Calif. Dept. Agr. Mo. Bul. 10: 345-358. Sept., 1921.

The proposed treatment is "deduced from actual resulting conditions of damage by frost sustained by the vines as observed in the field."

NOVÁK, V.

(1497)

OBSERVATIONS ON CERTAIN BIOCLIMATICALLY IMPORTANT TEMPERATURES. [trans. title]. Českoslov. Akad. Zěmědělska Vestník (Czechoslovakia Acad. Agr. Bul.). 4: 802-807. 1928. [German abstract p. 805-807.]

Abstract in Expt. Sta. Rec. 61: 613. Nov., 1929.

Not examined.

NOVÁK, V.—Continued.

"This article calls attention especially to the influence of plant cover on the temperature of the air at different heights above the soil up to 2 meters (6.56 feet). It is shown that the temperature near the soil is sufficiently modified under certain conditions to be of considerable importance in relation to plant growth. The effect of closely clipped sod in lowering the night temperature at 5 cm. above the soil was found to be especially pronounced."

NOVIKOV, V. A. (1498)
INVESTIGATIONS ON THE COLD RESISTANCE OF PLANTS. Zhur. Opytn. Agron. Iugo—Vostoka (Jour. Expt. Landw. Südost. Eur.-Russlands) 6: 71-100 1928.

Not seen.

In Russian, with English summary.

NOVOPOKROVSKY, IVAN V. (1499)
EFFECT OF TEMPERATURE ON THE SPORE GERMINATION OF CEREAL SMUTS. Jour. Agr. Research [Don and North Caucasus] 8: 64-88. 1926.
Russian.

NUERNBERGK, ERICH. (1500)
BEITRÄGE ZUR PHYSIOLOGIE DES TAGESSCHLAFS DER PFLANZEN. 138 p. Jena, G. Fischer, 1925. (Bot. Abhandl. hrsg. von Dr. K. Goebel, Heft. 8.)
Daylight sleep of plants in relation to light and temperature is studied. (1501)

UNTERSUCHUNGEN ÜBER DIE LICHTVERTEILUNG IN AVENAKOLEOPTILEN UND ANDEREN PHOTOTROPISCH REIZBAREN PFLANZENORGANEN BEI EINSEITIGER BELEUCHTUNG; EIN BEITRAG ZUR KRITIK DER BEWEISFÜHRUNG DER BLAAUWSCHEN THEORIE. 162 p. Jena. G. Fischer, 1927. (Bot. Abhandl., Hft. 12.)

The reaction to light of certain plant organisms is discussed with special reference to Blaauw's theory.

OAKLEY, R. A., and WESTOVER, H. L. (1502)
EFFECT OF THE LENGTH OF DAY ON SEEDLINGS OF ALFALFA VARIETIES AND THE POSSIBILITY OF UTILIZING THIS AS A PRACTICAL MEANS OF IDENTIFICATION. Jour. Agr. Research 21: 599-607. July 15, 1921.

Experiments are described which show that "it is the day-night relation of alfalfas and not their reaction to temperature that causes the development of marked differences between the seedlings of the various varieties when seed is sown at certain times of the year."

ODÉN, SVEN. (1503)
VÄXTERNA OCH LJUSET. 27 p. Stockholm, O. L. Svanbäcks boktryckeri, 1927.

A study of the influence of light on growth.

O'GARA, P. J. (1504)
FROST PREVENTION WORK IN THE ROGUE RIVER VALLEY, OREG., DURING THE SPRING OF 1910. U. S. Mo. Weather Rev. 38: 1437-1440, Sept., 1910.

A table of temperatures injurious to fruit is given. A discussion of weather conditions in the Rogue River Valley shows that conditions there are ideal for the prevention of frost injury.

(1504a)
THE PROTECTION OF ORCHARDS IN THE PACIFIC NORTHWEST FROM SPRING FROSTS BY MEANS OF FIRES AND SMUDGES. U. S. Dept. Agr. Farmers' Bul. 401, 24 p. 1910.

"The object of this bulletin is to give, in considerable detail, the results of successful experiments and the methods employed in preventing frost injury by means of fires and smudges in the apple, peach, and pear orchards of the Rogue River Valley in southern Oregon during the spring of 1909."

OHLWEILER, WILLIAM W. (1505)
THE RELATION BETWEEN THE DENSITY OF CELL SAPS AND THE FREEZING POINTS OF LEAVES. Missouri Bot. Gard. Ann. Rpt. 23: 101-131. 1912.

The author concludes that "extreme differences in sap density, in general, are accompanied by a corresponding difference in their resistance to freezing . . . that in plants of the same genus, or varieties of the same species, differences in sap density correspond to differences in their resistance to freezing."

- OKADA, T. (1506)
ON THE POSSIBILITY OF FORECASTING THE APPROXIMATE YIELD OF RICE CROP FOR NORTHERN JAPAN. Jour. Met. Soc. Japan 36 (11): 91-97. Nov., 1917.
"It is a well-known fact that the yield of the rice crop for northern Japan chiefly depends on the temperature of air and the duration of bright sunshine in August."
(1507)
ON THE POSSIBILITY OF FORECASTING THE SUMMER TEMPERATURE AND THE APPROXIMATE YIELD OF RICE CROP FOR NORTHERN JAPAN. Bul. Cent. Met. Observ. Japan. 3 (1): 19-32. 1919.
Contains a tentative application of statistical methods to the problem of forecasting the approximate temperature of August which is the dominant factor in connection with the rice crop for the year.
(1508)
ON THE POSSIBILITY OF FORECASTING THE SUMMER TEMPERATURE AND THE APPROXIMATE YIELD OF RICE CROP FOR NORTHERN JAPAN. Second paper. 9 p.
Reprint from Mem. Imp. Marine Observ. v. 1, no. 1, [1922].
The author finds correlation between the yield of rice in Hokkaido and the winter temperature at Nemuro and Dutch Harbour.
OLDERSHAW, A. W. (1509)
DROUGHT AND CROP PRODUCTION. Jour. Min. Agr. [Gt. Brit.] 36: 1030-1032. Feb., 1930.
ON "HARDENING" PLANTS. Gard. Chron. 71: 251. May 20, 1922. (1510)
ONODERA, JIRO. (1511)
THE VARIABILITY OF THE DEVELOPMENT OF THE MECHANICAL TISSUE OR STEREOE IN LEAVES OF RICE, AND ITS CORRELATION TO DROUGHT RESISTANCE. Jour. Imp. Agr. Exp. Sta. Nishigahara 1: 163-174. Oct., 1929.
In Japanese, with English summary.
OPEN WINTER AND PLANT LIFE. U. S. Mo. Weather Rev. 49 (1): 20-21. Jan. 1921. (1512)
A brief, popular account of the destructive effect on many plants of an open winter as contrasted with a normal one. A reprint from the "Philadelphia Public Ledger," Jan. 5, 1921, of an article by Dr. John W. Harshberger.
OPITZ. (1513)
FUSARIUMBEPFALL UND AUSWINTERUNG VERSCHIEDENER WINTERWEIZENSORTEN.
^a Mitt. Deut. Landw. Gesell. 35: 488-489. Sept. 4, 1920.
The effect of low temperature on fusarium wilt of winter wheat is briefly noted.
ORGANIZATION MÉTÉOROLOGIQUE INTERNATIONALE. COMMISSION DE MÉTÉOROLOGIE AGRICOLE. 3. RÉUNION, COPENHAGUE, 1929. (1514)
PROCÈS-VERBAUX. 101 p. Stockholm, 1929. (Statens Met. Hydrografiska Anst. Pub. 276.)
Among the papers presented were one on the Dependence of Yield on Weather Conditions by P. Holdefleiss and one on the Determination of Relative Frost Resistance of Different Varieties of Plants Through Artificial Refrigeration by Å. Åkerman.
ORR, MATTHEW Y. (1515)
THE EFFECT OF FROST ON THE WOOD OF LARCH. Roy. Scot. Arbor. Soc. Trans. 39 (pt. 1): 38-41. Mar., 1925.
"It is the purpose of the writer . . . to illustrate certain phases of the phenomena associated with frosting, which are not so obvious, since they are microscopic, and which are not figured in literature that is readily accessible."
ORTON, C. R. (1516)
METEOROLOGY AND LATE BLIGHT OF POTATOES. (Abstract) Phytopathology 6: 107. Feb., 1916.
This is an abstract of a paper presented at the seventh annual meeting of the American Phytopathological Society, in Columbus, Ohio, December 28-31, 1915. It is shown that neither precipitation alone, nor atmospheric temperatures, either alone or when correlated with precipitation, have much direct bearing on late blight of potatoes. "High relative humidity the latter part of July and in August is possibly the most important factor."

- ORTON, WILLIAM A. (1517)
 ENVIRONMENTAL INFLUENCES IN THE PATHOLOGY OF SOLANUM TUBEROSUM.
 Jour. Wash. Acad. Sci. 3: 180-190. Apr. 4, 1913.
 Weather conditions favorable to the growth of the potato are considered.
- OSBORN, THEODORE G. B. (1518)
 NOTES ON TWO VINE DISEASES WHICH OCCURRED ON THE RIVER MURRAY IN
 OCTOBER, 1921. Jour. Dept. Agr. So. Aust. 26: 225-230. Oct. 16, 1922.
 The second disease was probably the result of frost.
- OSKAMP, JOSEPH. (1519)
 WINTER INJURY IN INDIANA. Amer. Soc. Hort. Sci. Proc. 1918: 25-30.
 The effect of winter injury to apple and peach trees is discussed.
- (1520)
 WINTER INJURY OF FRUIT TREES. 12 p. Lafayette, 1918. (Ind. Agr. Expt.
 Sta. Circ. 87.)
 The author discusses the effect of the severe winter of 1917-18 on
 peach and apple orchards in Indiana.
- OSMASTON, A. E. (1521)
 FROST AS A CAUSE OF UNSOUNDNESS IN SAL. Indian Forester 49: 539-543.
 Oct., 1923.
- OSTERHOUT, W. J. V. (1522)
 ENDURANCE OF EXTREME CONDITIONS AND ITS RELATION TO THE THEORY OF
 ADAPTATION. Amer. Jour. Bot. 5: 507-510. Dec., 1918.
 "A species of Tradescantia lived for nearly two years without soil or
 water: It afterward grew vigorously in a saturated atmosphere and was
 finally placed under water for a month, during which time it grew
 slightly and was alive at the end of the experiment."
- OSTERWALDER, ADOLF. (1523)
 WINTERFROSTSCHÄDEN AN REBEN UND OBSTBÄUMEN IN DER MITTLEREN ZÜRICH-
 SEE-GEDEND. Schweiz. Ztschr. Obst u. Weinbau 38: 281-298. July 27, 1929.
 Not seen.
 Frost damage to vines and fruit trees.
- OTTO, RICHARD. (1524)
 ÜBER DIE KLIMATISCHEN EINFLÜSSE AUF DIE CHEMISCHE ZUSAMMENSETZUNG
 VERSCHIEDENER ÄPFELSORTEN VOM HERBST 1900 IM VERGLEICH MIT DENSEL-
 BEN SORTEN VOM HERBST 1898. Landw. Jahrb. 31: 605-618. 1902.
 The author gives the results of a study of the chemical changes pro-
 duced in various varieties of apples by the temperature and precipitation
 (rain, snow, hail, dew, etc.) conditions in 1898 and 1900. That other
 weather conditions such as the duration of the sunlight had an important
 influence is also suggested.
- OVERHOLSER, E. L. (1525)
 COLOR DEVELOPMENT AND MATURITY OF A FEW FRUITS AS AFFECTED BY LIGHT
 EXCLUSION. Amer. Soc. Hort. Sci. Proc. 1917: 73-85.
 "Varieties of apples, pears, peaches, nectarines, and apricots develop
 no color when . . . light is excluded . . . The effect of light exclusion
 upon color development with several varieties of plums, cherries, cur-
 rants, dark-colored gooseberries, and blackberries, varied. In some cases
 the development of red color was completely inhibited, in some, color
 development was checked or delayed, and in other cases color develop-
 ment was not appreciably hindered . . . Light exclusion has no effect
 upon the attainment of maturity or in prolonging the period of edibility
 of apples." In the case of a few varieties of cherries and plums the
 period of edibility is not appreciably affected; with other varieties there
 is a delay of several days in the attainment of maturity.
- and TAYLOR, R. H. (1526)
 RIPENING OF PEARS AND APPLES AS MODIFIED BY EXTREME TEMPERATURES. Bot.
 Gaz. 69: 273-296. April 1920.
 "The experiments suggest that with an excessively hot season during
 the time of ripening, Bartlett and Easter and possibly other pears might
 be allowed to remain on the trees somewhat longer than with a normal
 season. For Yellow Newtown and no doubt other varieties of apples,
 which are to be stored any length of time, the necessity of quickly
 cooling after harvesting is emphasized."

- PADDOCK, WENDELL (1527)
WINTER INJURY IN OHIO. Amer. Soc. Hort. Sci. Proc. 1918: 30-31.
Winter injury to peach and apple trees in 1917-18 is briefly discussed.
— and CHARLES, F. G. (1528)
THE EFFECT OF SHADE UPON FRUIT-BUD DIFFERENTIATION. Amer. Soc. Hort. Sci. Proc. 1928: 195-197.
A test made with 20 apple trees showed that "shading for a period of 10 weeks, when begun just as the blossoming period was over, did not prevent blossom buds from forming, nor from opening in a normal manner the following spring . . . Some spurs made a distinct second growth and set fruit buds which bloomed the following spring."
— and WHIPPLE, ORVILLE B. (1529)
FRUIT GROWING IN ARID REGIONS. 395 p. New York, The Macmillan Co., 1910.
Contains a section on frost injury and protection. (1530)
PAGNOUL, A. (1530)
UEBER DEN EINFLUSS DER NIEDERSCHLÄGE UND DER BODENBESCHAFFENHEIT AUF DIE ERTRÄGE DER FUTTERPFLANZEN. Biedermann's Centbl. 29 (Hft. 1): 16-19. Jan., 1900.
The influence of rainfall on the yield of fodder plants is briefly noted. (1531)
PALMER, ANDREW H. (1531)
THE AGRICULTURAL SIGNIFICANCE OF SUNSHINE AS ILLUSTRATED IN CALIFORNIA. U. S. Mo. Weather Rev. 48: 151-154. March, 1920.
The author discusses the effect of sunshine upon the growth and distribution of fruits and vegetables in California. (1532)
ECONOMIC RESULTS OF DEFICIENT PRECIPITATION IN CALIFORNIA. U. S. Mo. Weather Rev. 48: 586-589. Oct., 1920.
Describes the effect on vegetation of the drought of 1920 when the average yield per acre of many crops was reduced. (1533)
SNOW AND ITS VALUE TO THE FARMER. Sci. Mo. 6: 128-141. Feb., 1918.
Contains a popular account of the benefits derived by the farmer from snow which is described as "one of our most important agricultural resources." (1534)
PALMER, W. S. (1534)
SOME CLIMATIC FEATURES OF WYOMING AND THEIR RELATION TO DRY FARMING. U. S. Mo. Weather Rev. 37: 54-56. Feb., 1909.
A brief statement with regard to rainfall and temperature in Wyoming and their effect on crop production. "Man has been learning how to conserve the moisture which falls, and to adapt the proper crops to the conditions of a limited rainfall." (1535)
PAMMEL, LOUIS H. (1535)
EFFECT OF WINTER ON SHRUBS AT AMES, IOWA. Iowa State Hort. Soc. Rpt. 53: 39-41. 1918.
— and others. (1536)
SOME NOTES ON FROST INJURY TO PLANTS IN IOWA IN 1928. Iowa State Hort. Soc. Rpt. 63: 132-138. 1928. (1537)
PANTANELLI, E. (1537)
ALTERAZIONI DEL RICAMBIO E DELLA PERMEABILITÀ CELLULARE A TEMPERATURE PROSSIME AL CONGELAMENTO. Atti. R. Accad. Naz. Lincei, Rend. Cl. Sci. Fis. Mat. e Nat. (Anno 36, ser. 5) 28: 205-209. 1919.
The effect of low temperatures on cellular permeability is discussed. (1538)
SU LA RESISTENZA DELLE PIANTE AL FREDDO. Atti. Accad. Lincei. (5) 27: 126-130, 148-153. 1918.
Abstract in Internatl. Rev. Sci. and Pract. Agr. [Rome] 9: 1416-1417. Dec., 1918.
The results are given of experiments made with sunflower, tomato, and maize at temperatures below and above freezing point. 59247°—31—10

- PARK, O. W. (1539)
 THE INFLUENCE OF HUMIDITY UPON SUGAR CONCENTRATION IN THE NECTAR OF VARIOUS PLANTS. *Jour. Econ. Ent.* 22: 534-544. June, 1929.
 "Sugar concentration in nectar was found to vary inversely with relative humidity. Correlation between these two factors was found to be much closer in some types of flowers than in others."
- PARKINSON, S. T. (1540)
 DAMAGE DONE TO FRUIT BY FROST. *Jour. Southeastern Agr. Col.* [Wye, Kent] 16: 249-260. 1907.
- PASCOE, T. (1541)
 RAINFALL AND THE WHEAT YIELD. *Jour. Dept. Agr. So. Aust.* 16: 292-295. Oct., 1912.
 A comparison is given of rainfall at Adelaide and wheat yields in South Australia from 1880 to 1911. The author concludes that wheat yields are less dependent upon rainfall than formerly, owing to improved methods of cultivation.
- PASQUALI, A. (1542)
 OSSERVAZIONI SUL BINOMIO "FRUMENTO GELO." *Gior. Agr. Domenica* 38 (8): 74. Feb. 19, 1928.
 The effect of frost on different varieties of wheat is discussed.
- PASSERINI, N. (1543)
 SOPRA LA VEGETAZIONE DI ALCUNE PIANTE ALLA LUCE SOLARE-DIRETTA E DIFFUSA. *Bul. Soc. Bot. Ital.* 1: 13-14. Jan., 1902.
 The effects of direct sunlight and of diffused light on 13 different species of plants are shown.
- (1544)
 SULLO SVILUPPO DI CALORE IN ALCUNE PIANTE E SULLA TEMPERATURA CHE ASSUMONO GLI ORGANI VEGETALI DURANTE LA INSOLAZIONE. *Nuovo Gior. Bot. Ital.* (n. s.) 8: 64-74. Jan., 1901.
 The author studies the effect of direct sunlight on plant temperature.
- PATTERSON, CECIL FREDERICK. (1545)
 GROWTH IN SEEDLINGS OF PHASEOLUS VULGARIS IN RELATION TO RELATIVE HUMIDITY AND TEMPERATURE. *Roy. Canad. Inst. Trans.* 14 (pt. 1): 23-68. May, 1922.
 From experiments carried out on seedlings of the common bean, the author concludes that "the influence of relative humidity upon growth in higher plants has been greatly overestimated . . . The harmful effects of low relative humidity and of atmospheres possessing high evaporation coefficients upon growth in plants may be overcome, in a large measure, by maintaining an abundance of moisture in the substratum."
- PATTERSON, E. M. (1546)
 THE THEORIES ADVANCED IN EXPLANATIONS OF ECONOMIC CRISES. *Ann. Amer. Acad. Polit. and Social Sci.* 59 (whole no. 148): 133-147. May, 1915.
 The author discusses briefly the theory of the close connection between weather, crops, and economic cycles as propounded by W. Stanley Jevons and Henry L. Moore.
- PATTON, P. (1547)
 THE RELATIONSHIP OF WEATHER TO CROPS IN THE PLAINS REGION OF MONTANA. 66 p. Bozeman, 1927. (*Mont. Agr. Expt. Sta. Bul.* 206.)
 The relation of rainfall, temperature, humidity, and wind to crops during the period from 1882 to 1921 is studied.
- PATWARDHAN, G. B. (1548)
 PRELIMINARY OBSERVATIONS ON SOME DROUGHT RESISTING PLANTS OF THE DECCAN. *Poona Agr. Col. Mag.* 3: 200-202. Jan., 1912.
- (1549)
 FURTHER OBSERVATIONS ON SOME DROUGHT RESISTING PLANTS OF THE DECCAN. *Poona Agr. Col. Mag.* 4: 108-110. Oct., 1912.
- PEARSON, GUSTAV A. (1550)
 FACTORS CONTROLLING THE DISTRIBUTION OF FOREST TYPES. *Ecology* 1: 139-159, 289-308. 1920.
 The author studies the effect of temperature, precipitation, wind, etc., on "forest types" in the San Francisco Mountains of Arizona, and concludes that "the upper limits of all the forest types are determined primarily by low temperature as related to photosynthesis, and that the lower limits are determined primarily by deficient moisture supply."

PEARSON, GUSTAV A.—Continued. (1551)

LIGHT AND MOISTURE IN FORESTRY. *Ecology* 11: 145-160. Jan., 1930.

The relative importance of light and soil moisture in the forest is discussed.

(1552)

THE RELATION BETWEEN SPRING PRECIPITATION AND HEIGHT GROWTH OF WESTERN YELLOW-PINE SAPLINGS IN ARIZONA. *Jour. Forestry* 16: 677-689. Oct., 1918.

"Western yellow pine in northern Arizona makes its height growth during the period of lowest precipitation in the year . . . Factors reflecting atmospheric moisture conditions, including evaporation, wind movement, relative humidity, cloudiness, and length of rainless period, from April 1 to June 30, show a close, though not entirely consistent, relation to height growth. Temperature on the sites studied appears to be important only in so far as it affects moisture conditions . . . There is reason for believing that what has been discovered in regard to western yellow pine will apply to other tree species and to other forms of vegetation in this region, wherever moisture is a critical factor."

(1553)

TEMPERATURE SUMMATIONS WITH REFERENCE TO PLANT LIFE. *U. S. Mo. Weather Rev.* 52: 218-221. Apr., 1924.

The writer regards the "mean maximum as a far better index of temperature than the mean, when plant life is under consideration." He discusses schemes devised to "express in a single figure the total amount of heat available for plant growth during the growing season."

PEDERSEN, R. (1554)

HABEN TEMPERATURSCHWANKUNGEN ALS SOLCHE EINEN UNGÜNSTIGEN EINFLUSS AUF DAS WACHSTHUM? *Arb. Bot. Inst. Würzburg* 1: 563-583. 1874.

The author takes issue with the conclusions of Koeppen (see under Koeppen, Wladimir) and asserts that temperature fluctuations as such have no influence whatever upon plant growth.

PEGLION, VITTORIO. (1555)

LE GELATE TARDIVE E GLI EFFETTI SULLA VEGETAZIONE DEL FRUMENTO. *Ital. Agr.* 64: 360-363. July, 1927.

The effect of late spring frosts on wheat is discussed.

PEIRCE, G. J. (1556)

STUDIES OF IRRITABILITY IN PLANTS. THE FORMATIVE INFLUENCE OF LIGHT. *Ann. Bot. [London]* 20: 449-485. Oct., 1906.

The author discusses the influence of light upon germination, early growth, and form of certain plants.

PELTIER, GEORGE L. (1557)

INFLUENCE OF TEMPERATURE AND HUMIDITY ON THE GROWTH OF PSEUDOMONAS CITRI AND ITS HOST PLANTS AND ON INFECTION AND DEVELOPMENT OF THE DISEASE. *Jour. Agr. Research* 20: 447-506. Dec. 15, 1920.

This is a study of the effect of temperature and humidity on the growth and development of citrus trees as well as on the development of citrus diseases.

(1558)

A STUDY OF THE ENVIRONMENTAL CONDITIONS INFLUENCING THE DEVELOPMENT OF STEM RUST IN THE ABSENCE OF AN ALTERNATE HOST. *Lincoln. 1922-1925. (Nebr. Agr. Expt. Sta. Research Bul. 22, 15 p.; Research Bul. 25, 52 p.; Research Bul. 34, 12 p.; Research Bul. 35, 11 p.).*

The influence of temperature, humidity, and light on stem rust of wheat is studied.

— and FREDERICH, WILLIAM J. (1559)

EFFECTS OF WEATHER ON THE WORLD DISTRIBUTION AND PREVALENCE OF CITRUS CANCER AND CITRUS SCAB. *Jour. Agr. Research* 32: 147-164. Jan. 15, 1926.

The amount, frequency, and seasonal distribution of precipitation is a limiting factor in the development of both diseases in question.

— and FREDERICH, WILLIAM J. (1560)

RELATION OF ENVIRONMENTAL FACTORS TO CITRUS SCAB. *Jour. Agr. Research* 28: 241-254. April, 1924.

It is claimed that under Alabama conditions a light or bad scab year can be predicted to some extent by the mean temperature prevailing in March, a temperature below normal indicating a bad season, while a temperature above normal is usually followed by a light scab year.

- PELTIER, GEORGE L. and FREDERICH, WILLIAM J.—Continued. (1561)
 WEATHER AND ITS RELATION TO CITRUS SCAB EPIDEMICS IN ALABAMA. (Abstract.) *Phytopathology* 12: 57. Jan., 1922.
 Abstract of paper presented at the thirteenth annual meeting of the Phytopathological Society, Toronto, Canada, Dec. 28–31, 1921.
 "Under Alabama conditions, a light or bad scab year can be predicted by the monthly mean temperature prevailing during March."
 ——— and Goss, R. W. (1562)
 CONTROL EQUIPMENT FOR THE STUDY OF THE RELATION OF ENVIRONMENT TO DISEASE. 16 p. Lincoln, 1924. (Nebr. Agr. Expt. Sta. Bul. 28.)
 PENNINGTON, L. H. (1563)
 RELATION OF WEATHER CONDITIONS TO THE SPREAD OF WHITE PINE BLISTER RUST IN THE PACIFIC NORTHWEST. *Jour. Agr. Research* 30: 593–607. Apr., 1925.
 The author discusses the effect of moisture, temperature, and wind upon the spread and severity of white pine blister rust.
 PERALTA Y LEAÑO, FERNANDO DE. (1564)
 A STUDY OF THE RELATION OF CLIMATIC CONDITIONS TO THE VEGETATIVE GROWTH AND SEED PRODUCTION OF RICE. *Philippine Agr.* 7: 159–193. Jan., 1919.
 Experiments show that evaporation affects the growth and yield of the McIntew variety of rice more than other factors. There seems to be no clear relation between rainfall and insolation and grain yield. "Low temperature during the first month of growth seems to induce early maturity."
 PERCENTAGE REDUCTION FROM FULL YIELD PER ACRE OF EIGHT CROPS FROM STATED CAUSES, 1909–1924. U. S. Dept. Agr. Crops and Markets 3, Sup. 1: 11–12. Jan., 1926. (1565)
 Tables are given showing the annual losses due to adverse weather conditions from 1909 to 1924 in the case of corn, wheat, oats, apples, barley, hay, potatoes, and cotton.
 PERIODICITY IN PLANTS. *Amer. Bot.* 22: 108. Aug., 1916. (1566)
 "Much evidence has been accumulated to show that periodicity in plants is due to internal causes, but the prevailing idea seems to be that it is due to external conditions which are determined largely by heat, moisture, and oxygen. It would be difficult, however, to explain some cases of periodicity by these latter factors."
 PERIODICITY IN WEATHER AND CROPS. *Nature* [London] 105: 370–371. May 20, 1920. (1567)
 The author discusses a lecture by Sir Wm. Beveridge in which he "produces ostensibly consistent evidence in favour of a period of 15½ years during the past three centuries. The argument rests upon historic records of poor harvests, of Indian famines, of tropical droughts, and equally disastrous wet summers in higher latitudes."
 PERKINS, ARTHUR J., and SPAFFORD, W. J. (1568)
 RAINFALL DISTRIBUTION OVER THE GROWING PERIOD OF WHEAT. *Jour. Dept. Agr. So. Aust.* 14: 964–966. May, 1911.
 This brief discussion of the effect upon the growth and yield of the wheat crop of the amount of rain it receives throughout its vegetative period is contained in the fourth report on the permanent experiment field of the Roseworthy Agricultural College for the years 1909–10 and 1910–11.
 PERRET, CLAUDE. (1569)
 LA DESICCATION PRÉMATURÉE DES PIEDS DE POMMES DE TERRE DANS LA LOIRE. *Bul. Soc. Pathol. Vég. France* 9: 257–259. Oct.–Dec., 1922.
 The effect of drought on potato plants is described.
 PERRY, GEORGE S. (1570)
 SOME EFFECTS OF FROST IN NORTHERN PENNSYLVANIA. *Forest Leaves* 17: 107–108. Feb., 1920.
 PERSONS, WARREN M., FOSTER, WILLIAM T., and HETTINGER, ALBERT J. jr. (1571)
 ED.
 THE PROBLEM OF BUSINESS FORECASTING. Papers presented at the eighty-fifth annual meeting of the American Statistical Association, Washington, D. C., December 27–29, 1923. Boston, Houghton Mifflin Co., 1924, 317 p. (Pubs. Pollak Foundation for Econ. Research 6.)
 Includes the following papers.

PERSONS, WARREN M., FOSTER, WILLIAM T., and HETTINGER, ALBERT J., jr., ED.—
Continued.

WALLACE, H. A.

FORECASTING CORN AND HOG PRICES.

Contains a discussion of the effect of weather conditions on the corn field and hence on the price of corn and of hogs.

KINCER, J. B.

FORECASTING CROPS FROM WEATHER CONDITIONS.

The purpose of the paper is "to consider, briefly, the problem from a broad viewpoint, and to point out and discuss those things which, in our opinion, present the more formidable difficulties in investigational work, together with suggestions as to possible remedies." The author discusses the adequacy of the correlation coefficient as an expression of relationship in studies dealing with the relation of weather to crops.

PETERSON, GEORGE M. (1572)

THE RELATION OF ANNUAL WEATHER SURPLUSES TO NET FARM INCOMES. *Ann. Amer. Acad. Polit. and Social Sci.* 142: 391-401. Mar., 1929.

"Annual crop surpluses due largely to the weather are constantly recurring . . . This article is an attempt to analyze and illustrate the factors involved in this problem from an economic standpoint."

PETHYBRIDGE, GEORGE H. (1573)

MYCOLOGY AND PLANT PATHOLOGY. *Brit. Mycol. Soc. Trans.* 12 (pt. 2-3): 91-105. June, 1927.

Contains a brief reference to the importance of atmospheric moisture and temperature in the production of disease in plants.

PETRI, LIONELLO. (1574)

ALTERAZIONI PRODOTTE DAI FREDDI TARDIVI SUI CULMI DEL GRANO. *R. Staz. Patol. Veg. [Rome]* *Bol. Mens.* (n. s.) 7: 194-202. Apr.-June, 1927.

(1575)

RICERCHE SULLE CAUSE DEI DEPERIMENTI DELLE VITI IN SICILIA. I. CONTRIBUTO ALLO STUDIO DELL'AZIONE DEGLI ABBASSAMENTI DI TEMPERATURA SULLE VITI IN RAPPORTO ALL'ARRICCIAMENTO. (*Mem. R. Staz. Patol. Veg. [Rome]*) 212 p. Roma, Tipografia nazionale di G. Bertero e C., 1912.

A study of the effect of low temperature on vines.

PETTINGER, NICHOLAS A. (1576)

THE VEGETATION-REPRODUCTION RELATIONSHIP IN CROP PLANTS AS AFFECTED BY CERTAIN FACTORS. 6 p. Urbana, Ill. 1929.

Abstract of thesis (Ph. D.) Univ. Ill., 1927.

Seven crops, corn, oats, barley, wheat, rye, and soybeans were studied in connection with the effects of temperature and moisture on the vegetation-reproduction relationship.

PETURSON, B. (1577)

EFFECT OF TEMPERATURE ON HOST REACTIONS TO PHYSIOLOGIC FORMS OF PUC-CINIA CORONATA AVENAE. *Sci. Agr.* 11: 104-110. Oct., 1930.

PEAFFE, WILHELM. (1578)

ÜBER DEN EINFLUSS DER HÖHENLAGE AUF DEN EINTRITT DER VEGETATIONSPHASEN. *Arb. Landw. Kammer Hessen, Hft.* 26. p. 31-38. 1919. *Phaenologische Mitt.*

The influence of altitude on the effect of temperature, frost, light, and insolation on different stages of plant growth is discussed.

PFEIFFER, NORMA E. (1579)

ANATOMICAL STUDY OF PLANTS GROWN UNDER GLASSES TRANSMITTING LIGHT OF VARIOUS RANGES OF WAVE LENGTHS. *Bot. Gaz.* 85: 427-436. June, 1928.

(1580)

MICROCHEMICAL AND MORPHOLOGICAL STUDIES OF EFFECT OF LIGHT ON PLANTS. *Bot. Gaz.* 81: 173-194. Apr., 1926.

"The maximum development of the plant (considering height and differentiated tissue) occurs in the 12-hour tomato and the 17-hour buckwheat."

PFEIFFER, TH., BLANCK, E., and FLÜGEL, M. (1581)

WASSER UND LICHT ALS VEGETATIONSFAKTOREN UND IHRE BEZIEHUNGEN ZUM GESETZE VOM MINIMUM. *Landw. Vers.-Sta.* 76: 169-236. 1912.

The influence of water and light on plant growth is discussed.

- PFEIFFER, TH., BLANCK, E., FLÜGEL M., and SIMMERMACHER, W. (1582)
 BEZIEHUNGEN ZWISCHEN DEM EINFLUSS VON LICHT UND STICKSTOFF ALS MINIMUMFAKTOREN AUF DAS WACHSTUM DER PFLANZEN. Landw. Vers.-Sta. 86: 44-62. 1915.
 The authors discuss the effect of light on plant growth.
- and RIPPEL, A. (1583)
 ÜBER DEN EINFLUSS VON DURSTPERIODEN AUF DAS WACHSTUM DER PFLANZEN. Landw. Vers.-Sta. 96: 353-363. 1920.
 The effect of a period of drought upon lupine, spurry, barley, and oats is studied.
- PHILLIPS, FRANK J. (1584)
 EFFECT OF A LATE SPRING FROST IN THE SOUTHWEST. Forestry and Irrig. 13: 484-492. Sept., 1907.
 "The worst effects of the storm were a general check in forest growth and the death of a small percentage of the smallest coniferous reproduction."
- PHILLIPS, H. A. (1585)
 EFFECT OF CLIMATIC CONDITIONS ON FRUIT TREES. U. S. Mo. Weather Rev. 51: 360. July, 1923.
- (1586)
 EFFECT OF CLIMATIC CONDITIONS ON THE BLOOMING AND RIPENING DATES OF FRUIT TREES. p. 1379-1416. Ithaca, 1922. N. Y. Cornell Agr. Exp. Sta. Mem. 59.)
 The author suggests that length of day is not a factor in the blooming of fruit trees. Detailed tables show the relation of latitude and altitude to fruiting and ripening dates.
- PHILLIPS, JOHN. (1587)
 RAINFALL INTERCEPTION BY PLANTS. Nature [London] 118: 837-838. Dec. 11, 1926; 121: 354-355. Mar. 10, 1928.
- "PHOTOPERIODISM." ANOTHER PHYSIOLOGICAL ASPECT OF FRUIT-PRODUCTION. Trop. Agr. 2 (1): 7-8. Jan., 1925. (1588)
 A summary of some views of scientists on the influence of light on plants, signed E. E. C.
- PICKETT, F. L. (1589)
 NOTES ON THE SURVIVAL OF EXTREME DROUGHT BY CERTAIN MOSSES. Bryologist 17: 94-95. Nov., 1914.
- PICKHOLZ, L. (1590)
 EIN BEITRAG ZUR FRAGE ÜBER DIE WIRKUNG DES LICHTES UND DER INTERMITTIERENDEN TEMPERATUR AUF DIE KEIMUNG VON SAMEN, SOWIE ÜBER DIE ROLLE DES WASSERGEHALTES DER SAMEN BEI DIESER WIRKUNG. Ztschr. Landw. Vers. Österr. 14: 124-151. Feb., 1911.
 A contribution to the study of the effect of light and change of temperature on germination.
- PICKLER, WILLIAM EUGENE. (1591)
 WATER CONTENT AND TEMPERATURE AS FACTORS INFLUENCING DIASTASE FORMATION IN THE BARLEY GRAIN. Plant World 22: 221-238. Aug., 1919.
 Experiments are described which show that "absorption of water by the barley grains is dependent on temperature . . . At a constant temperature diastase formation increases with the water content of the grains . . . Diastase formation in the barley grain is affected by temperature though not to so great an extent as by the moisture content of the grains."
- PIETERS, A. J. (1592)
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- PIGOU, A. C. (1593)
 INDUSTRIAL FLUCTUATIONS. 397 p. London, Macmillan & Co. Ltd., 1927.
 In chapter 4, the author discusses briefly the correlation between industrial fluctuations and changes in the yield of crops and between the latter and weather conditions. References to various authors on the subject are given on p. 211.

- PINKHOF, M. (1594)
 METHODIC PRECAUTIONS IN FURTHER ANALYSIS OF LIGHT-GROWTH RESPONSE.
 K. Akad. van Wetensch. Amsterdam. Proc. Sect. Sci. 27: 665-670. 1924.
 Some theories are discussed with regard to the so-called light-growth response in the oat coleoptile.
- PITMAN, GEORGE W. (1595)
 WEATHER AND POTATOES IN WYOMING. Author's abstract. Bul. Amer. Met. Soc. 7: 14. Jan., 1926.
 "The ideal climate for the [potato] plant is one in which there is about 14 inches of rainfall and an average temperature of 64° for a period of 128 days, which includes dates of two weeks before planting until two weeks previous to digging . . . Temperature conditions for July and May appear to affect yields most."
- PITTIER, HENRI. (1596)
 LA QUESTION DES PORTE-OMBRE DANS LES PLANTATIONS DE CAFÉIERS ET DE CACAoyERS. Rev. Bot. Appl. et Agr. Colon. 6 (54): 65-69. Feb. 28, 1926.
 A study of the best shade for coffee and cocoa trees.
- PITTMAN, H. A. (1597)
 SOME PARASITIC AND NON-PARASITIC CAUSES OF "EMPTY" OR "TIPPED" HEADS IN WHEAT. Jour. Dept. Agr. West. Aust. (2) 7: 153-164. Mar., 1930.
 Among the causes of empty and tipped heads in wheat are listed hot, dry winds and frost.
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- PLANTS SEE WITHOUT EYES. Sci. News Letter 17: 239. Apr. 12, 1930. (1599)
 A brief account of investigations being carried on in the Smithsonian Institution in Washington, D. C., on the influence of light wave lengths on plants.
- PLITT, CHARLES C. (1600)
 A STUDY ON THE EFFECT OF EVAPORATION AND LIGHT ON THE DISTRIBUTION OF LICHENS. Bul. Torrey Bot. Club 51: 203-210. May, 1924.
- POJARKOVA, ANTONINA J. (1601)
 TEMPERATURBEDINGUNGEN DER KEIMUNG ALS BESTIMMENDER FAKTOR FÜR ÄHRENBILDUNG BEIM WINTERGETREIDE. Ber. Deut. Bot. Gesell. 45: 627-637. 1927.
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 In Russian, with German summary.
 The relation between winter rest and cold resistance of woody plants is studied.
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- (1603)
 WINTERRUHE, RESERVESTOFFE UND KÄLTERESISTENZ BEI HOLZPFLANZEN. Ber. Deut. Bot. Gesell. 42: 420-429. Jan. 29, 1925.
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- POKROWSKI, G. (1604)
 ÜBER DIE LICHTABSORPTION VON BLÄTTERN EINIGER BÄUME. Biochem. Ztschr. 165: 420-426. Nov. 30, 1925.
 The effect of light on the leaves of certain trees is discussed.
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 DIE WIRKUNG DES AUSSERGEWÖHNLICH STRENGEN WINTERS 1928-29 AUF DIE WALDBÄUME. Českoslov. Akad. Zemědělské Vestník 6: 274-278. Mar., 1930.
 An account of the effect of the severe winter of 1928-29 on forest trees in the Czechoslovak Republic.
- POLETIKA, W. VON (1606)
 AGROKLIMATISCHE VERHÄLTNISSE RUSSLANDS. Kulturtechniker 31: 507-519. Nov.-Dec., 1928.
 Abstract in Expt. Sta. Rec. 61: 416-417. Oct., 1929.
 "The predominating influence of climate in Russian agriculture is especially emphasized in this article . . . Among the climatic handicaps enumerated are sharp changes of temperature from summer to winter

L'OLETIKA, W. VON—Continued.

and from day to night; long and severe winters, especially in eastern Siberia, and hot summers in the South; lack of snow cover in Siberia and occurrence of perpetually frozen soils; deficiency of precipitation in the South and Southeast; unfavorable rainfall distribution in the spring and early summer; short growing period; and droughts, hot winds, and frosts."

(1607)

KLIMA UND LANDWIRTSCHAFT RUSSLANDS. Ber. Landw. 9: 478-528. 1929.

Five climatic zones are distinguished. The principal climatic factors affecting agriculture are drought, snow, and frost. The relation of climate to agricultural practice and rural industries is discussed.

POOL, RAYMOND J.

(1608)

SOME EFFECTS OF THE DROUGHT UPON VEGETATION. Science (n. s.) 38: 822-825. Dec. 5, 1913.

Some of the effects of the drought of 1913 on crops in Nebraska, Kansas, Missouri, and Iowa are pointed out.

POOL, VENUS W., and MCKAY, M. B.

(1609)

CLIMATIC CONDITIONS AS RELATED TO CERCOSPORA BETICOLA. Jour. Agr. Research 6: 21-60. Apr. 3, 1916.

"Climatic conditions of both winter and summer bear an important relation to the vitality and development of *Cercospora beticola*. During cold weather certain conditions enable the fungus to overwinter, while certain other conditions are inimical to its growth, a fact which has an important bearing on the control of the disease, as the earliest infections on growing sugar beets (*Beta vulgaris*) originate from the overwintered fungus. In the early summer, after infection occurs, temperature, relative humidity, rainfall, and wind directly affect the development of the fungus, the rapidity of conidial production, and subsequent infection."

POPP, HENRY W.

(1610)

EFFECT OF LIGHT INTENSITY ON GROWTH OF SOYBEANS AND ITS RELATION TO THE AUTOCATALYST THEORY OF GROWTH. Bot. Gaz. 82: 306-319. Nov., 1926.

The author finds that the plants receiving the greatest amount of light are the most vigorous, and produce the best leaves and fruit, although those grown in the shade have longer stems.

(1611)

A PHYSIOLOGICAL STUDY OF THE EFFECT OF LIGHT OF VARIOUS RANGES OF WAVE LENGTHS ON THE GROWTH OF PLANTS. Amer. Jour. Botany 13: 706-736. Dec., 1926.

Little difference is found between plants grown under full sunlight conditions and those grown in the absence of ultra-violet radiation.

(1612)

SUMMARY OF LITERATURE ON SOME PHASES OF THE EFFECT OF LIGHT ON PLANT GROWTH. Illuminating Engin. Soc. Trans. 19: 981-994. Dec., 1924.

"The author summarizes those phases of the subject of the effect of light on plant growth that have a bearing on work being conducted at the Boyce Thompson Institute for Plant Research, particularly those papers dealing with intensity and duration of light in their effects on plant growth."

PORTERFIELD, W. M.

(1613)

VARIATION IN THE RATE OF GROWTH OF BAMBOO IN RELATION TO TEMPERATURE. China Jour. 7: 191-205. Oct., 1927.

A comparison between a spring-growing and an autumn-growing bamboo shows that in both cases temperature is a controlling factor in the growth of the bamboo shoot.

POSEGA, ERNST.

(1614)

UEBER DEN EINFLUSS DER EINSTRAHLUNG AUF DEN BODEN UND DEN PFLANZEN-ERTRAG. Bot. Arch. 9: 112-124. Jan. 1, 1925.

Contains a study of the influence of temperature on plant yield.

POSKIN, P.

(1615)

A PROPOS DE MÉTÉOROLOGIE AGRICOLE. Ciel et Terre 33: 388-393. Dec., 1912.

Contains a plea for the development of agricultural meteorology in Belgium and a suggested program.

- [POSSIBILITY OF DETERMINING THE HARDINESS OF PLANTS BY LABORATORY TESTS.]
Science (n. s.) 71: Sup. p. XIV. Jan. 3, 1930. (1616)
A reference to results of experiments conducted by Prof. S. T. Dexter, of the University of Wisconsin, and described by him before the American Society of Plant Physiologists. "If the measurements in the experiments can be standardized . . . they may serve as indices of plant hardiness."
- POTATO DISEASES (BLIGHT) IN 1920. Gard. Illus. 43: 300. May 21, 1921. (1617)
"Excessive wet alone is not sufficient to cause a 'blight year'; a high temperature is also necessary if the fungus is to become rampant."
- POTTER, GEORGE F. (1618)
WINTER INJURY. N. H. Dept. Agr. Rpt. 1924-26: 197, 209.
Paper read before the New Hampshire Horticultural Society. It contains a brief discussion of some of the more important forms of winter injury to fruit trees which are likely to occur in New Hampshire orchards.
- PRAGER, WALTER. (1619)
RUMÄNIEN'S LANDWIRTSCHAFTLICHE KLIMATOGRAPHIE. 203 p. Halle A. S., C. A. Kaemmerer & Co., 1909.
Abstract in Expt. Sta. Rec. 22: 315. Abstract number, 1910.
"This book, which is intended to aid in the improvement of Roumanian agriculture by diffusing a better knowledge of the relation of climate to crops, describes in detail the physiographic and climatic features of 3 typical districts, namely, the mountains, the foothills, and the plains, and discusses the selection and culture of crops with reference to the climatic conditions."
- PRIANTSCHNIKOW, D. (1620)
ÜBER DEN EINFLUSS DER TEMPERATUR AUF DIE ENERGIE DES EIWEISSEZERFALLS. Ber. Deut. Bot. Gesell. 18: 285-291. 1900.
Experiments with seeds of peas show that the energy of protein metabolism increases with an increase of temperature up to 37° C.
- PRICE, H. L. (1621)
THE APPLICATION OF METEOROLOGICAL DATA IN THE STUDY OF PHYSIOLOGICAL CONSTANTS. Va. Agr. Expt. Sta. Ann. Rpt. 1909-10: 206-212.
The influence of temperature on the blooming period of orchard plants is studied.
- PRIESTLEY, J. H. (1622)
THE FIRST SUGAR OF PHOTOSYNTHESIS AND THE RÔLE OF CANE SUGAR IN THE PLANT. New Phytol. 23: 255-265. Dec. 15, 1924. (1623)
LIGHT AND GROWTH. I. THE EFFECT OF BRIEF LIGHT EXPOSURE UPON ETIOLATED PLANTS. II. ON THE ANATOMY OF ETIOLATED PLANTS. III. AN INTERPRETATION OF PHOTOTROPIC GROWTH CURVATURES. IV. AN EXAMINATION OF THE PHOTOTROPIC MECHANISM CONCERNED IN THE CURVATURE OF COLEOPTILES OF THE GRAMINEAE. New Phytol. 24: 271-283. Dec. 31, 1925; 25: 145-170, 213-226, 227-247. 1926.
The author interprets the changes effected by light on the development of etiolated plants as showing "that unilateral light, by bringing about a redistribution of growth on one side of the plant, must cause a positive phototropic curvature."
- PRITCHARD, FRED J., and PORTE, W. S. (1624)
THE RELATION OF TEMPERATURE AND HUMIDITY TO TOMATO LEAF SPOT. Phytopathology 14: 156-169. Mar., 1924.
- PROCHNOW, OSKAR. (1625)
REACTIONEN AUF TEMPERATUR-REIZE. (BIOPHYSIKALISCH DESZENDENZTHEORETISCHE STUDIEN. t. 1.) 63 p. Berlin, W. Juk, 1908.
The reaction of plants and animals to the stimulus of temperature is discussed.
- THE PROTECTION OF ORCHARDS FROM SPRING FROSTS. Jour. Bd. Agr. [Gt. Brit.] 117: 558-563. Oct., 1910. (1626)
Experiments are described which prove that damage to fruit trees by frost can be controlled to a certain extent. A table of temperatures is given at which the principal orchard fruits are liable to be injured by frost when in bud, in blossom, etc.

- PRUNET, ADOLPHE. (1627)
EFFETS DE LA SÉCHERESSE ET ACTION DES ENGRAIS MINÉRAUX SUR DIVERSES VARIÉTÉS DE POMMES DE TERRE. Jour. Agr. Sud-Ouest 3: 94-106. Apr., 1924.
The effect of drought on potatoes is discussed.
- PRXISCIKHOVSKII, R. (1628)
RAINS AND THE CEREALS CROP IN THE GOVERNMENT OF KHERSON, RUSSIA. Internatl. Inst. Agr. [Rome], Bur. Agr. Intell. and Plant Diseases Bul. 3: 362-363. Feb., 1912.
An abstract of a Russian article published in the Rev. Expt. Agr., G. 12, Kniga 1, p. 154-155, St. Petersburg, 1911, shows that the crops in the district under consideration depend less on the quantity of rainfall than on its distribution.
- PULMAN, J. A. (1629)
ACTION OF WEATHER AND MOISTURE IN SOIL ON THE GROWTH OF BUCKWHEAT. Internatl. Inst. Agr. [Rome], Bur. Agr. Intell. and Plant Diseases Bul. 2: 814-815. Apr., 1911.
Abstract in Expt. Sta. Rec. 25: 718. Dec. 1911.
This is an abstract of an article in Russian published in the Year-Book Admin. Rural Organ. and Agr., Dept. Agr., Russia, G. 3: 67-69. Petersburg, 1910. It shows the effect of temperature and rainfall on the growth of buckwheat.
- (1630)
BUCKWHEAT AND FROST. Internatl. Inst. Agr. [Rome], Bur. Agr. Intell. and Plant Diseases Bul. 2: 816. Apr., 1911.
Abstract in Expt. Sta. Rec. 25: 718. Dec., 1911.
An abstract of an article in Russian published in the Yearbook of the Admin. Rural Organ. and Agr., Dept. Agr., G. 2: 70-71, Petersburg, 1910, which shows the effect of frost on buckwheat seedlings.
- (1631)
EFFECT OF WEATHER ON THE GROWTH OF OATS AND MILLET. Internatl. Inst. Agr. [Rome], Bur. Agr. Intell. and Plant Diseases Bul. 2: 816. April, 1911.
Abstract in Expt. Sta. Rec. 25: 718. Dec., 1911.
An abstract of an article in Russian, published in the Yearbook Admin. Rural Organ. and Agr., Dept. Agr., G. 3: 71-74, Petersburg, 1910, shows the effect on oats and millet of temperature, cloudiness, and rainfall.
- (1632)
THE YIELD OF MILLET (*PANICUM MILIACEUM*) IN DEPENDENCE UPON METEOROLOGICAL FACTORS. Trudy Selsk. Kholz. Met. I, no. 5, p. 6-19. 1909.
In Russian. Not examined. Reference given as found.
Abstract in Expt. Sta. Rec. 23: 117. Aug., 1910.
"Observations during 10 years led the author to the conclusion that the chief factors determining the yield of millet are temperature and precipitation. During the period from stooling to heading the most important rôle belongs to temperature . . . During the period of heading the chief rôle is played by precipitation. Failure of precipitation at this time destroys the hope for a good crop. If in the 20 days from the beginning of the heading to the formation of the grain the rainfall is less than 30 mm., the yield will be less than medium."
- PUTTING PLANTS ON DAYLIGHT RATIONS. HOW PRODUCTION MAY BE ARTIFICIALLY HASTENED BY THE PROPER CONTROL OF LIGHT EXPOSURE. Sci. Amer. 122: 624. 634. June 5, 1920. (1633)
- QUAYLE, E. T. (1634)
SUNSPOTS AND AUSTRALIAN RAINFALL. Roy. Soc. Victoria. Proc. (n. s.) 37 (pt. 2): 131-143. 1925.
The author discusses the effect of solar activity upon the rainfall in different parts of Australia.
- QUINTUS, R. A. (1635)
THE CULTIVATION OF SUGAR CANE IN JAVA. 164 p. London, Norman Rodger, 1923.
Contains a brief account of the effect of rainfall on the sugar-cane crop in Java. p. 4-8.
- QUISENBERRY, KARL S., and CLARK, J. A. (1636)
BREEDING HARD RED WINTER WHEATS FOR WINTER HARDINESS AND HIGH YIELD. 28 p. Washington, D. C., 1929. (U. S. Dept. Agr. Tech. Bul. 136.)

- RABAK, FRANK. (1637)
THE EFFECT OF CULTURAL AND CLIMATIC CONDITIONS ON THE YIELD AND QUALITY OF PEPPERMINT OIL. 16 p. Washington, D. C., 1916. (U. S. Dept. Agr. Bul. 454.)
The influence of light and shade and of frost on the peppermint plant is studied.
- RABATÉ, EDMOND, and others (1638)
LA RÉSISTANCE DES BLÉS AUX GELÉES D'HIVER. Compt. Rend. Acad. Agr. France 15: 555-559. May 1, 1929.
Cold resistance of wheat is commented on.
- RACIBORSKI, M. (1639)
UEBER DIE KEIMUNG DER TABAKSAMEN. Bul. Inst. Bot. Buitenzorg 6: 1-10. 1900.
The author finds that tobacco seeds do not germinate in darkness.
- RAINFALL AND TEMPERATURE AND CORN YIELD. U. S. Dept. Agr., Weather Bur. Natl. Weather and Crop Bul. 18 (series 1916): 2-3, 7. July 18, 1916. (1640)
A diagram shows "the effect of the July rainfall and temperature upon the yield of corn in Ohio during the period from 1854 to 1915, inclusive."
- RAINFALL AND THE YIELD OF HAY AND OATS. Wallaces' Farmer 44: 1078-1079. May 16, 1919. (1641)
- RAND, FREDERICK V., and CASH, LILLIAN C. (1642)
STEWART'S DISEASE OF CORN. Jour. Agr. Research 21: 263-264. May 16, 1921.
Infection of the young corn plant from the seed was found to be largely dependent upon the growth condition of the seedling during the first week or two after planting as influenced by weather conditions. "Whenever rains have been plentiful about the time of sowing the seed, wilt has later developed in abundance, whereas the same lots of seed planted during a dry period have invariably given much less infection. With moisture conditions approximately the same, the later plantings at higher temperatures have given a greater amount of wilt."
- RAUM, JOHANNES. (1643)
ZUR KENNNTNIS DER MORPHOLOGISCHEN VERÄNDERUNGEN DER GETREIDEKÖRNER UNTER DEM EINFLUSSE KLIMATISCHER VERHÄLTNISSE. 137 p. Stadtkamhof, Druck von J. & K. Mayr. 1906.
A study of the influence of weather conditions on the morphology of grain with particular reference to oats.
- RAVAZ, LOUIS. (1644)
LES DÉPÉRISSEMENTES DE LA VIGNE EN ALGÉRIE. Prog. Agr. et Vitic. 87: 7-11. Jan. 2, 1927.
A brief account of the influence of drought on the vine in Algeria.
- RAWSON, H. E. (1645)
SUNRISE, MOISTURE, AND GROWTH. Transvaal Agr. Jour. 4: 558-566, 743-754. 1906.
The effect of the early rays of the sun on vegetation is studied. "The simultaneous and promiscuous planting of selected seeds of different kinds so distributed as to admit sunrise rays and to ward off excessive illumination might mean a far larger return than that from a single crop, however well watered and looked after."
This article is reviewed in Transvaal Agr. Jour. 5: 140-148, Oct., 1906, by Herbert Ingle and I. B. Pole Evans, who disagree with some of its conclusions. They give "a short description of the relationships between light and temperature on the one hand and plant growth on the other." and conclude that "many plants would be benefited by being shaded from the midday sun."
- RAYMOND, L. C. (1646)
EVIDENCE OF FREEZING IN A TWELVE ROWED FLINT GRAIN CORN. Jour. Agr. and Hort. [Quebec] 22: 196-197. May 1, 1919.
- REBOUL, G. (1647)
LES APPLICATIONS DE LA MÉTÉOROLOGIE À L'AGRICULTURE ET AU TOURISME. Bul. Soc. Encour. Indus. Natl. [Paris] 124: 577-594. July-Sept., 1925.
The effects of temperature and rainfall on vegetation are discussed.
- REDDICK, DONALD. (1648)
THE WEATHER AND THE PLANT PATHOLOGIST. U. S. Mo. Weather Rev. 38: 4. Jan., 1910.

REDDICK, DONALD—Continued.

A brief account of the influence of weather on some plant diseases.
 "The fungus is directly dependent upon weather conditions. There must not only be rain, but foggy or cloudy weather also."

REDINGTON, GEORGE. (1649)

THE EFFECT OF THE DURATION OF LIGHT UPON THE GROWTH AND DEVELOPMENT OF THE PLANT. Cambridge Phil. Soc. Biol. Rev. and Biol. Proc. 4: 180-208. Apr., 1920.

The author reviews and discusses recent studies on the subject.

REED, CHARLES D. (1650)

WEATHER AND CORN MATURITY IN IOWA. U. S. Mo. Weather Rev. 55: 485-488. Nov., 1927.

The author studies the causes of "a well-defined tendency for corn in Iowa to become more and more damaged by frost before it reaches maturity."

REED, CLARENCE A. (1651)

HARDINESS IN NUT TREES. Northern Nut Growers Assoc. Rpt. Ann. Meeting 15: 127-135. Sept., 1924.

(1652)

PECAN TREES REQUIRE ABUNDANT SUNSHINE AND SPACE. U. S. Dept. Agr. Yearbook 1926: 571-574. 1927.

REED, HOWARD S. (1653)

A NOTE ON THE STATISTICS OF CYCLIC GROWTH. Natl. Acad. Sci. Proc. 9: 65-67. Mar. 15, 1923.

"The writer has made a study of the relations between the length of lateral shoots and their position on young branches of the apricot tree, and has found certain definite relationships which throw some light upon the unity of growth processes in organisms."

— and BARTHOLOMEW, E. T. (1654)

THE EFFECTS OF DESICCATING WINDS ON CITRUS TREES. 59 p. Berkeley, 1930. (Calif. Agr. Expt. Sta. Bul. 484.)

"Extensive damage to citrus trees exposed to desiccating winds is due to defoliation, death of twigs, and loss of fruit . . . Windburn and scorch of citrus leaves are produced when low humidity, high temperature, and high wind velocity are concurrent."

REED, WILLIAM GARDNER. (1655)

THE PROBABLE GROWING SEASON. U. S. Mo. Weather Rev. 44: 509-512. Sept., 1916.

The author shows the advantage to the farmer of the possibility of computing the chances of killing frosts.

(1656)

PROTECTION FROM DAMAGE BY FROST. Geogr. Rev. 1: 110-122. Feb., 1916.

Describes a variety of frost-protecting appliances. "Protection from frost damage is based on the prevention of freezing temperatures or on the protection of frosted plants from too rapid warming."

— and FELDKAMP, CORA L. (1657)

SELECTED BIBLIOGRAPHY OF FROST IN THE UNITED STATES. U. S. Mo. Weather Rev. 43: 512-516. Oct., 1915.

"This bibliography has been selected from all the material on frost and frost prevention under American conditions which has come to the attention of the writers."

— and TOLLEY, HOWARD R. (1658)

WEATHER AS A BUSINESS RISK IN FARMING. Geogr. Rev. 2: 48-53. July, 1916.

The method of determining the risk of frost occurrence is described.

REID, MAEY E. (1659)

GROWTH AND NITROGEN METABOLISM OF SQUASH SEEDLINGS I-II. Amer. Jour. Bot. 17: 272-289, 396-415. 1930.

I. Variations at different seasons of the year. II. With respect to stages of development and the influence of light.

"Seasonal peculiarities in the development of plants grown at similar temperatures are a consequent of variations in the duration, intensity, and quality of light, the differences reaching a maximum at the time of the summer and winter solstices."

REID, MARY E.—Continued.

(1660)

GROWTH OF SEEDLINGS IN LIGHT AND IN DARKNESS IN RELATION TO AVAILABLE NITROGEN AND CARBON. *Bot. Gaz.* 87: 81-118. Feb., 1929.

(1661)

RELATION OF COMPOSITION OF SEED AND THE EFFECTS OF LIGHT TO GROWTH OF SEEDLINGS. *Amer. Jour. Bot.* 16: 747-769. Nov., 1929.

"It is possible to study the effect of light on the assimilation of inorganic nitrogen, the synthesis into proteins of the products formed therefrom, and the utilization of these products in growth independently of carbohydrate synthesis." The results of such a study are given.

REILING, HANS.

(1662)

KEIMVERSUCHE MIT GRÄSERN ZUR ERMITTLUNG DES EINFLUSSES, DEN ALTER UND LICHT AUF DEN KEIMPROZESS AUSÜBEN. 87 p. Halle, a. S., Druck von H. John, 1912.

Inaug.-Diss., Jena.

The effect of light on the germination of grasses is studied.

REIN, RICHARD.

(1663)

UNTERSUCHUNGEN ÜBER DEN KÄLTETOD DER PFLANZEN. *Ztschr. Naturw.* 80: 1-38. Sept. 10, 1908.

The freezing point in plants is based on the composition of the protoplasm and varies with the adaptability of the plant to a colder or warmer climate.

RELATION BETWEEN WHEAT YIELD AND RAINFALL IN INDIA AND AUSTRALIA. U. S. Dept. Agr., Bur. Agr. Econ. Foreign Crops and Markets 14: 360-361. Mar. 14, 1927.

(1664)

A preliminary study of the relation between rainfall and wheat production in the Punjab indicates that "acreage is largely controlled by the nature of the Monsoon, but the winter rainfall at a critical period is an important factor in yield." The result of a study of rainfall and wheat yield in Northern Victoria, Australia, made by Henry Barkley and published in the *Econ. Rec.*, v. 2, no. 3, is briefly indicated.

RELATION OF ENVIRONMENT TO HEALTH AND DISEASE IN PLANTS. p. 47-49. Madison, 1924. (*Wis. Agr. Expt. Sta. Bul.* 362.)

(1665)

Some references to studies on the effect of weather on plant diseases.

RELATION OF WEATHER CONDITIONS TO YIELD OF WHEAT AND BARLEY. Rothamsted Expt. Sta., Harpenden, Rpt. 1929: 38.

(1666)

Notes on the effect of rainfall, temperature, and hours of sunshine on the yield of wheat and barley at Rothamsted.

REMY, TH., and HAASSTERT, H.

(1667)

SAATZEITVERSUCHE. *Landw. Jahrb.* 72: 175-207. 1930.

The author gives examples to show that weather conditions influence the time of sowing of crops.

RENNER, OTTO.

(1668)

DIE WACHSTUMSREAKTIONEN BEI LICHT-UND SCHWERKRAFTREIZUNG. *Ztschr. Bot.* 14: 449-462. 1922.

A discussion of Blaauw's theory of the reaction of plant growth to light.

RESEARCH ON DROUGHT IN RUSSIA. *Internatl. Rev. Sci. and Pract. Agr.* [Rome] (n. s.) 4: 382-398. Apr.-June, 1926.

(1669)

This is an account, signed G. Z., of a number of Russian contributions to the study of drought in that country, and its effect on crops.

THE RESISTANCE OF PLANTS TO WIND. *Agr. News* [Barbados] 10: 185. June 10, 1911.

(1670)

"The 'Bulletin Agricole' of Mauritius, for February, 1911 [p. 343], has an interesting note on the effects, on various plants, of the hurricane that visited the island at the beginning of that month. It states that cocoa-nut palms showed a useful power of resistance to the wind, while the tamarind trees, although they had obtained their full leafage, merely suffered a scorching of the leaves and soon sprouted again . . . Several acres of cotton were completely destroyed, though generally this plant exhibited reasonable behaviour under the trying conditions . . . This plant has proved its possession of a power of resistance to high winds."

RÉSISTANCE REMARQUABLE DU SAPIN BLANC AU POIDS DE LA NEIGE. Jour. Forest. Suisse 76: 138-140. June, 1925. (1671)

An account is given of the remarkable resistance of a white pine tree to an unusually heavy snow.

RETTIG, H. (1672)

ÜBER DEN EINFLUSS DER LUFTFEUCHTIGKEIT AUF DIE ENTWICKLUNG UND DIE GEWEBEDIFFERENZIERUNG DER PFLANZEN. Bot. Arch. 25: 128-172. 1929.

Not seen.

The influence of humidity on plant development.

RHOADS, ARTHUR S. (1673)

THE FORMATION AND PATHOLOGICAL ANATOMY OF FROST RINGS IN CONIFERS INJURED BY LATE FROSTS. 15 p. Washington, D. C., 1923. (U. S. Dept. Agr. Bul. 1131.)

The effect of frost injury to conifers is studied.

(1674)

SUN-SCALD OF GRAPES AND ITS RELATION TO SUMMER PRUNING. Amer. Fruit Grower Mag. 44 (3): 20, 47. Mar., 1924.

RICHARDS, B. L. (1675)

RELATION OF RAINFALL TO THE LATE BLIGHT OF PHOMA ROT OF THE SUGAR-BEET. Phytopathology 12: 443. Sept., 1922.

Abstract of a paper presented at the sixth annual meeting of the Pacific division, American Phytopathological Society, Salt Lake City, Utah, June 22-24, 1922.

Data obtained indicate that this blight is favored by drought and, in Utah at least, is closely correlated with low rainfall in June and July.

RICHARDSON, A. D. (1676)

THE INFLUENCE OF PROLONGED DAYLIGHT IN THE VEGETATIVE SEASON ON THE QUALITY OF CONIFEROUS TIMBER GROWN AT HIGH ALTITUDES. Gard. Chron. (3) 79: 32, 49, 66-67, 84, 103-104, 138-139, 158-159. 1926.

RICHARDSON, A. E. V. (1677)

RELATIONSHIP BETWEEN THE AVERAGE WHEAT YIELD AND THE WINTER RAINFALL. Jour. Dept. Agr. Victoria, 14: 37-40. Jan., 1916.

The author shows that there is a quantitative relationship between the average wheat yield and the winter rainfall in Victoria, which may be used to forecast the probable average wheat yield early in November.

(1678)

THE WATER REQUIREMENTS OF FARM CROPS. Jour. Dept. Agr. Victoria 21: 193-212, 257-284, 321-339, 385-404, 449-481. 1923.

The author gives the results of investigations covering a period of six years, the object of which was "to determine, for Australian conditions, the amount of water required to elaborate a unit weight of dry matter for the principal farm crops and the influence of variety, season, varying moisture saturation, fertilizers, and physical environmental factors on the water requirements of crops."

(1679)

WHEAT AND ITS CULTIVATION. RELATIONSHIP BETWEEN WHEAT YIELD AND RAINFALL. Jour. Dept. Agr. Victoria 23: 158-171. Mar., 1925.

As a part of an article on wheat and its cultivation, the author shows the close relationship between the average yield of wheat and the rainfall during the growing period of the crop.

— and TRUMBLE, H. C. (1680)

THE TRANSPIRATION RATIO OF FARM CROPS AND PASTURE PLANTS IN THE ADELAIDE DISTRICT. Jour. Dept. Agr. So. Aust. 32: 224-244. Oct. 15, 1928.

This investigation was made to determine the water requirements of farm crops and typical pasture plants in the Adelaide plains area and contains a study of the factors which make for effective utilization of the rainfall.

RICHTER, A. A. (1681)

COLD RESISTANCE BY PLANTS. I. DYNAMICS OF SOLUBLE CARBOHYDRATES DURING WINTER IN RYE AND WHEAT. Zhur. Opytn. Agron. Īugo-Vostoka (Jour. Expt. Landw. Südost. Eur.-Russlands) 4: 326-345. 1927.

In Russian with German abstract, p. 345.

Not examined.

Abstract also in Expt. Sta. Rec. 60: 214. Feb., 1929.

This is the first of a series having to do with experiments on the resistance of plants to cold, made at the experimental farm during the winter of 1925-26.

RICHTER, A. A.—Continued.

"Cold resistance was determined for rye, two wheat varieties, and two rye-wheat hybrids, the materials being taken four times directly from the field in the winter of 1925-26. The young rye plants were fully winter resistant. In the case of winter-resistant wheat, the portion above ground and the roots gradually died away, leaving alive only the more resistant portions to start new shoots in the spring. The hybrids showed behavior intermediate between that of rye and that of wheat."

RICHTER, KARL. (1682)

ÜBER DEN EINFLUSS DES DURCHDRINGUNGSVERMÖGENS DER SONNENSTRAHLEN DURCH SCHNEE AUF DAS ARKTISCHE PFLANZENLEBEN. *Naturwissenschaften* 14: 501-503. 1926.

On the effect on Arctic plant life of the power of the sun's rays to penetrate snow.

RICÔME, H. (1683)

ACTION DE LA LUMIÈRE SUR DES PLANTES PRÉALABLEMENT ÉTIOLÉES. *Rev. Gén. Bot.* 14: 26-40, 72-88, 120-137. 1902.

The effect of light on etiolated plants of potatoes, beans, and lentils is studied.

(1684)

SUR LE DÉVELOPPEMENT DES PLANTES ÉTIOLÉES AYANT REVERDI À LA LUMIÈRE. *Compt. Rend. Acad. Sci. [Paris.]* 131: 1251-1253. Dec. 24, 1900.

The effect of sunlight upon the stem, the leaves, and the weight of etiolated plants is discussed.

RIGG, GEORGE B. (1685)

SNOW INJURY TO TREES. *Torreyia* 16: 257-260. Dec., 1916.

RIKER, ALBERT J. (1686)

THE INFLUENCE OF TEMPERATURE AND OF PREVIOUS INFECTION ON THE DEVELOPMENT OF CROWNGALL. (Abstract) *Phytopathology* 15: 45. Jan., 1925.

Abstract of a paper presented at the sixteenth annual meeting of the American Phytopathological Society, Washington, D. C., Dec. 30, 1924-Jan. 1, 1925.

(1687)

RELATIONS OF TEMPERATURE AND MOISTURE TO THE DEVELOPMENT OF CROWN-GALL. (Abstract) *Phytopathology* 14: 30. Jan., 1924.

Abstract of a paper presented at the fifteenth annual meeting of the American Phytopathological Society, Cincinnati, Ohio, Dec. 27, 1923-Jan. 1, 1924.

RIMBACH, AUGUST. (1688)

DIE JAHRESPERIODE DER PFLANZEN BEI MONTEVIDEO. *Bot. Jahrb.* 58: 182-189.

Tables illustrate the periodicity of a number of plants in and near Montevideo.

RIMPAU, W. (1689)

DIE WIRKUNG DES WETTERS AUF DIE ZUCKERRÜBEN-ERNTEN DER JAHRE 1891 UND 1892; DIE WIRKUNG DES WETTERS AUF DIE ZUCKERRÜBEN-ERNTEN DER JAHRE 1891 BIS 1895; DIE WIRKUNG DES WETTERS AUF DIE ZUCKERRÜBEN-ERNTEN DER JAHRE 1891 BIS 1900. *Landw. Jahrb.* 22: 503-516, 1893; 25: 935-962, 1896; 31: 471-487, 1902.

A study of the effect of temperature, precipitation, and sunshine on the sugar beet carried on from 1891 to 1900 has convinced the author that though he has been unable to formulate any definite rules as to their effect it should be possible to do so, given more data from all the sugar-beet-growing regions.

RITTER, GEORG. (1690)

DIE BESCHREIBUNG DES VEGETATIONSVERLAUFES 1916, ZUGLEICH EIN NEUER BEWEIS FÜR DIE ANPASSUNG DER PFLANZEN AN BESTIMMTE "WÄRMESUMMEN." *Bot. Centbl. Beihefte* 35 (Abt. 2, Hft. 2-3): 568-577. Oct., 1917.

The author finds a close connection between weather conditions and flowers, leaves, ripe fruits, leaf color, and the fall of leaves in the vicinity of Bremen.

RIVERA, VINCENZO. (1691)

FATTORI BIOLOGICI DI RENDIMENTO AGRARIO NEL MEZZOGIORNO. *Riv. Biol.* 2: 153-172. Mar.-Apr., 1920.

Abstract in *Expt. Sta. Rec.* 45: 526. Nov., 1921.

"It is concluded that as between the factors, intensity and duration of illumination, the latter is more important. Excessive luminous intensity does not favor the development of most plants. High tempera-

RIVERA, VINCENZO—Continued.

ture tends to shorten the vegetative period. Productivity is closely connected with elevated temperature and length of exposure to light. Regional differences are discussed."

RIVIER, M. A.

(1692)

INFLUENCE DE L'EAU (PLUIE ET ARROSAGE) SUR LE BLÉ ET SUR L'AVOINE AVANT ET APRÈS APPARITION DE L'INFLORESCENCE. *Ann. Sci. Agron. Franç. et Étrang.* 43: 303-313. July-Aug., 1926.

The author finds that the critical period for wheat and oats in regard to rain lies in the 20 days before heading.

RIVIÈRE, CHARLES.

(1693)

DU BLÉ. TEMPÉRATURE ET GERMINATION. *Soc. Nat. Acclim. France. Bul.* 61: 450-456. 1914.

The effect of temperature on wheat germination is briefly discussed.

ROBBINS, W. W.

(1694)

LIGHT RELATION OF PLANTS. *Planter* 75 (12): 232. Sept. 19, 1925.

The effects of light upon plants are discussed in four groups—chemical, heating, stimulus, and form. Special reference is made to the sugar beet.

ROBERTS, HERBERT F.

(1695)

GERMINATION OF SEEDS EXPOSED TO LOW TEMPERATURES. *Nature [London]* 114: 393. Sept. 13, 1924.

ROBERTS, R. A.

(1696)

CORRELATION OF YIELD IN OATS WITH METEOROLOGICAL OBSERVATIONS AT THE UNIVERSITY COLLEGE FARM, BANGOR, FOR THE PERIOD 1903-1926. *Jour. Agr. Sci. [England]* 18: 297-316. April, 1928.

In this study no correlation has been established between yield and total rainfall or total accumulated temperatures for the growing season. "The significance of warm dry conditions after sowing is not as high as the significance of high rainfall and low temperatures for the emergence of the panicles, though in this area both are concomitant with high yield . . . High temperatures, particularly if unaccompanied by precipitation in the later stages of ripening, may prove particularly damaging to grain yields. Drought periods, particularly from June onward, are likely to reduce yield, particularly if accompanied by high temperatures for the same period."

ROBERTS, RAY H.

(1697)

THE DEVELOPMENT AND WINTER INJURY OF CHERRY BLOSSOM BUDS. 24 p. Madison, 1922. (Wis. Agr. Expt. Sta. Research Bul. 52.)

"The extent of winter killing of the blossom buds of the cherry is largely in direct relation to the amount or degree of their development at the beginning of winter."

(1698)

AN OUTSTANDING CONTRIBUTION TO HORTICULTURE IN 1929. *Wis. Agr.* 20: 133-134. Jan., 1930.

A popular account of photoperiodism.

(1699)

RELATION OF COMPOSITION TO GROWTH AND FRUITFULNESS OF YOUNG APPLE TREES AS AFFECTED BY GIRDLING, SHADING, AND PHOTOPERIOD. *Plant Physiol.* 2: 273-286. July, 1927.

"Growth character, including blossom bud formation, is primarily dependent upon internal composition and secondarily upon external environment. That is, of the five environmental conditions employed—sun, shade, girdling, photoperiod, nitrogen nutrient—none produced a specific growth situation."

(1700)

WINTER INJURY TO CHERRY BLOSSOM BUDS. *Amer. Soc. Hort. Sci. Proc.* 1917: 105-110.

"The amount of the injury is in relation to the degree of development of the blossom buds, which, in turn, is usually in proportion to the amount of growth which the tree is making."

and BURK, E. F.

(1701)

THE RELATION OF PHOTOPERIOD TO THE DEVELOPMENT OF A WINTER FORCING RADISH. *Amer. Soc. Hort. Sci. Proc. Ann. Meeting* 26: 221. Des Moines, Iowa, Dec. 30, 1929-Jan. 1, 1930.

"Because of the striking response of the radish to photoperiod, nitrogen nutrient, and probably, temperature, the selections of plants for seed

- ROBERTS, RAY H.—Continued.
stock of a winter forcing variety should be made under the same environmental conditions in which the commercial crop is to be grown." (1702)
- ROBERTSON, C. L. (1702)
THE COTTON PLANT IN RELATION TO TEMPERATURE AND RAINFALL. Rhodesia Agr. Jour. 22: 71-76. Feb., 1925.
Temperature and rainfall conditions in the cotton-producing countries are briefly discussed and illustrated by graphs.
- ROBERTSON, CHARLES. (1703)
FLOWER SEASONS. Sci. Mo. 14: 201-203. Feb., 1922.
"The statements made here are based upon observations made from 1884 to 1913 at Carlinville, Illinois, regarding the blooming seasons of 470 indigenous and 54 introduced entomophilous (insect pollinated) flowers."
- ROBERTSON-PROSCHOWSKI, A. (1704)
LES PALMIERS DE LA CÔTE D'AZUR. LEUR RÉSISTANCE AU FROID. Bul. Soc. Nat. Acclim. France 53: 340-347, 367-375, 1906; 54: 22-32, 56-57, 1907.
Cold resistance of palm trees is studied.
- ROBINSON, EDWARD VAN D. (1705)
EARLY ECONOMIC CONDITIONS AND THE DEVELOPMENT OF AGRICULTURE IN MINNESOTA. 306 p. Minneapolis, March, 1915. (Minn. Univ. Studies Social Sci. 3.)
Contains references to the effect of weather conditions on crops.
- RODRIQUEZ, G. (1706)
STUDY OF INFLUENCE OF HEAT AND COLD ON GERMINATION OF HARD SEEDS IN ALFALFA AND SWEETCLOVER. Assoc. Off. Seed Analysts North America. Proc. Ann. Meeting 16: 75-76. June, 1924.
- ROGERS, WALTER E. (1707)
ICE STORMS AND TREES. Torreya 22: 61-63. July-Aug., 1922.
The author studies the effect of two ice storms on trees in central Wisconsin in 1922.
- ROGERS, WALTER E. (1708)
RESISTANCE OF TREES TO ICE STORM INJURY. Torreya 23: 95-99. Nov.-Dec., 1923.
The extent of ice-storm injury to different species of trees in Wisconsin is discussed.
- ROJALES, PEDRO S. (1709)
DISTRIBUTION OF ABACA IN CAVITE PROVINCE AS RELATED TO SOIL AND CLIMATE. Philippine Agr. 9: 219-227. Mar.-Apr., 1921.
Thesis. College of Agriculture. no. 120; Experiment Station contribution no. 49.
The effect of rainfall, temperature, and wind on the growth of abaca is discussed.
- ROLET, A. (1710)
LA GELÉE ET LES VÉGÉTAUX. Nature [Paris] 58: 177-179. Feb. 15, 1930.
Not seen.
- ROLFS, F. M. (1711)
WINTER KILLING OF TWIGS, CANKERS AND SUN SCALD OF PEACH TREES. 101 p. Mountain Grove, Mo., 1910. (Missouri State Fruit Expt. Sta. Bul. 17.)
- ROLFS, P. H. (1712)
EFFECT OF SHADING ON PINEAPPLES AND CITRUS FRUITS. Amer. Soc. Hort. Sci. Proc. 1903-04: 26-34.
Among the physical changes are equalization of temperature and increased humidity, and among the results are an increased crop of pineapples and a decreased crop of citrus fruits.
- ROMELL, LARS-GUNNAR. (1713)
FÖRSÖK MED KLÄNGNING AV GRAN-ÖCH TALLKOTT VID OLIKA TEMPERATURER. Skogen 12: 189-199. July, 1925.
An investigation of the effect of different temperatures on the growth of spruce and pine.
- ROMELL, LARS-GUNNAR. (1714)
EINE NEUE ANSCHEINEND TAGESAUTONOMISCHE PERIODIZITÄT. Svensk Bot. Tidskr. 12: 446-463. 1918.
A study of periodicity and its causes.

- Root, CLARENCE J. (1715)
RELATION OF SNOWFALL TO THE YIELD OF WINTER WHEAT. U. S. Mo. Weather
Rev. 47: 700. Oct., 1919.
"Considering only the elements of total snowfall and mean temperature, it would appear that the winters of light snowfall are followed by good wheat yields, and the winters of heavy snowfall are followed by light yields. However, this may be due in part to the fact that the temperature is less severe in the winters of light snowfall."
(1716)
WEATHER ELEMENTS AFFECTING THE 1924 WINTER WHEAT CROP IN ILLINOIS.
U. S. Mo. Weather Rev. 52: 499. Oct., 1924.
- Rosa, J. T., jr. (1717)
INVESTIGATIONS ON THE HARDENING PROCESS IN VEGETABLE PLANTS. 97 p.
Columbia, 1921. (Missouri Agr. Expt. Sta. Research Bul. 48.)
"It is the purpose of this paper to propose a theory comprehensive enough to explain satisfactorily the known facts as to the cold-resistance of living plants and to present data on the nature of the response of plant-tissues to treatments which result in increased hardiness. The injurious effects of temperature slightly above the freezing point on the growth of plants are not dealt with in this paper."
(1718)
PENTOSAN CONTENT IN RELATION TO HARDINESS OF VEGETABLE PLANTS. Amer.
Soc. Hort. Sci. Proc. 1920: 207-210.
Some theories with regard to the various factors connected with the killing of plants by cold are briefly indicated.
- (1719)
RELATIONSHIP OF WATER-RETAINING CAPACITY TO HARDINESS. Amer. Soc.
Hort. Sci. Proc. 1921: 166-169.
"It appears conclusive that hardiness and water-retaining power are closely associated . . . The increased water-retaining power is believed to be the direct cause of the cold resistance of hardy plants."
- Rose, DEAN H. (1720)
LEATHER ROT OF STRAWBERRIES. Jour. Agr. Research 28: 357-375. Apr. 26,
1924.
"There is a close relation between leather rot and rainfall . . . Temperature is important also, but its effect can not be determined without further study."
(1721)
RELATION OF STRAWBERRY FRUIT ROTS TO WEATHER CONDITIONS IN THE FIELD.
Phytopathology 16: 229-232. Mar., 1926.
The results of a study made at Beebe, Ark., in 1923 and 1924 show that rainfall and temperature are decisive factors in the development of strawberry fruit rots.
- Rosé, EDMOND. (1722)
ÉNERGIE ASSIMILATRICE CHEZ LES PLANTES CULTIVÉES SOUS DIFFÉRENTS
ÉCLAIREMENTS. Ann. Sci. Nat. Bot. (9) 17: 1-110. 1913.
The author shows that plants grown under a low light intensity are able to assimilate carbon dioxide at a much faster rate in low intensities than similar plants which had previously been growing under high light intensities.
- ROSENBAUM, J., and RAMSEY, G. B. (1723)
INFLUENCE OF TEMPERATURE AND PRECIPITATION ON THE BLACKLEG OF POTATO.
Jour. Agr. Research 13: 507-513. June 3, 1918.
"The severity of the disease during the growing season is closely correlated with temperature and precipitation and is dependent upon them. A high temperature and low precipitation tend to diminish the disease, while a low temperature and high precipitation produce conditions favorable for it."
- ROTHERS, B. (1724)
SUR LA CHUTE DES FLEURS DES ARBRES FRUITIERS À NOYAUX EN RELATION AVEC
LES BROUILLARDS SUR LES BORDS DE LA MER NOIRE EN CAUCASE. Défense des
Plantes. Bul. Bur. Permanent Cong. Ent. Phytopath. Russie 4: 298-301.
1927.
A brief account of the effect of fog on the flowers of stone-fruit trees on the shore of the Black Sea in the Caucasus.

- ROTMISTROFF, W. G. (1725)
DAS WESEN DER DÜRRE; IHRE URSACHE UND VERHÜTUNG. 68 p. Dresden und Leipzig, T. Steinkopff, 1926.
A study of drought.
- ROUSSAKOV, L. (1726)
OBSERVATIONS SUR L'INFLUENCE DES CONDITIONS MÉTÉOROLOGIQUES SUR LE DÉVELOPPEMENT DE LA ROUILLE DES CÉRÉALES. Internatl. Conf. Phytopath. and Econ. Ent. Rpt. 1923: 277-280.
The author calls attention to the varying effect of weather conditions on cereal rust according to its geographical distribution. In the south-east of Russia the development of cereal rust is favored by humidity and moderate temperature, in the northeast by increased temperature, and in the maritime regions by drought.
- ROUX, EUGÈNE. (1727)
SUR LES RELATIONS QUI EXISTENT ENTRE QUELQUES FACTEURS CLIMATIQUES ET LA VÉGÉTATION DE LA VIGNE. Compt. Rend. Acad. Agr. France 16: 509-513. Apr., 1930.
A brief account of a study of the influence of temperature, insolation, rainfall, and humidity on the development of vines.
- (1728)
SUR UNE RELATION EXISTANT ENTRE LES TROIS FACTEURS CLIMATIQUES: EAU, CHALEUR, LUMIÈRE ET LE RENDEMENT DES BLÉS. Compt. Rend. Acad. Agr. France 16: 513-520. Apr. 9, 30, 1930.
A study of the relation between rainfall, temperature, insolation, and wheat yield.
- RUBINSTEIN, EUGENIE. (1729)
DER JÄHRICHE GANG DER LUFTTEMPERATUR UND DIE VEGETATIONSPERIODE. Met. Ztschr. 44: 13-18. Jan., 1927.
Abstract in Expt. Sta. Rec. 56: 807. June, 1927.
"The methods and results of the author's study of the relation of temperature to the progress of plant growth are compared with those of Köppen."
- RUBNER. (1730)
DIE SPÄTFRÖSTE UND DIE VERBREITUNGSGRENZEN UNSERER WALDBÄUME. Forstw. Centbl. 43: 41-49, 100-114. 1921.
Abstract in Internatl. Rev. Sci. and Pract. Agr. [Rome] 12: 942-945. Aug., 1921.
A study of the effect of late spring frosts on the geographical distribution of forest trees.
- RUDOLFS, WILLEM. (1731)
INFLUENCE OF TEMPERATURE AND INITIAL WEIGHT OF SEEDS UPON THE GROWTH RATE OF PHASEOLUS VULGARIS SEEDLINGS. Jour. Agr. Research 26: 537-539. 1924.
Experiments made with bean seeds show that "temperature acting as an accelerating factor increases the advantage of plants grown from seeds with a greater initial weight."
- RUSCHMANN, W. (1732)
BANANE. 146 p. Berlin, Deutscher Auslandverlag, 1929. (Bangerts Aus-land-Bücherei, Nr. 36. Reihe: Wohltmann-Bücher, Bd. 8. Monographien zur Landwirtschaft wärmer Länder, begründet von Dr. W. Busse.)
Contains a brief account of weather conditions favorable to banana cultivation, including temperature, humidity, and wind. p. 16, 18-19.
- RUSSELL, EDWARD J. (1733)
THE EFFECT OF CLIMATE AND WEATHER ON THE SOIL. Jour. Roy. Agr. Soc. England 74: 1-21. 1913.
The author discusses the effect of weather on soil and the consequent effect on crop yield.
- (1734)
WHEAT-GROWING AND ITS PRESENT DAY PROBLEMS. Sci. Prog. in the Twen-tieth Century 5: 286-301. Oct., 1910.
The author discusses briefly the effect of rainfall and temperature on wheat production.

- RUSSELL, WILLIAM. (1735)
INFLUENCE DES CONDITIONS MÉTÉOROLOGIQUES SUR LA STRUCTURE DES PLANTES.
Assoc. Franç. Avanc. Sci. Compt. Rend. 47: 498-499. Bordeaux, 1923.
A note on the influence of meteorological conditions on the structure of
Stellaria holostea.
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- LA RÉSISTANCE DU BLÉ AUX GELÉES. Rev. Bot. Appl. Agr. Trop. 9: 781-783.
Dec., 1929. (1736)
A brief description of cold resistance in wheat.
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- SUR LA CICATRISATION DES TISSUS VÉGÉTAUX APRÈS LE GEL. Assoc. Franç.
Avanc. Sci. Compt. Rend. 46: 339-342. Montpellier, 1922. (1737)
On the effect of frost on plant tissues.
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- RUTH, WARREN A. (1738)
THE EFFECT OF DROUGHT ON APPLE TREES. Ill. State Hort. Soc. Trans. 59:
106-126. Dec., 1925.
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- THE EFFECT OF DROUGHT ON FRUIT TREES. Ill. Hort. 15 (1): 2-4. Jan. 10,
1926. (1739)
Abstract of a paper presented at the annual meeting of the Illinois
State Horticultural Society in 1926.
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- RYERSON, KNOWLES. (1740)
THE RECOVERY OF THE AVOCADO TREE AFTER THE 1922 FREEZE. Calif. Avocado
Assoc. Ann. Rpt. 1922-23: 26-29.
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- SABLON, LECLERO DU. (1741)
SUR LA TRANSPIRATION DES PLANTES GROSSES; INFLUENCE DE LA LUMIÈRE.
Compt. Rend. Acad. Sci. [Paris] 153: 1236-1238. Dec. 11, 1911.
As a result of experiments made with succulent plants it was found
that the influence of diffused light when compared with darkness is
greater than that of sunlight when compared with diffused light. The
stimulation of direct sunlight is due to increased temperature.
-
- SAFE DATE FOR PLANTING POTATOES. U. S. Dept. Agr. Weather Bur. Natl. Weather
and Crop Bul. 10 (ser. 1917): 3. May 22, 1917. (1742)
"White or 'Irish' potatoes are a cool weather crop." They grow
best where the mean annual temperature is between 40° and 50°, and
where the July temperature does not average over 70°.
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- SAFE DATES FOR PLANTING CORN. U. S. Dept. Agr. Weather Bur. Natl. Weather
and Crop Bul. 8 (ser. 1917): 2-3. May 8, 1917. (1743)
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- SAFFORD, WILLIAM EDWIN. (1744)
THE USEFUL PLANTS OF THE ISLAND OF GUAM . . . 416 p. U. S. Natl. Mus.
Contrib. U. S. Natl. Herbarium 9. Washington, Govt. print. off. 1905.
A paragraph deals with the damage done to coconut trees by hurri-
canes. p. 44.
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- SAGNIER, AND TISSERAND. (1745)
LE RÉGIME DES PLUIES ET LES RÉCOLTES EN RUSSIE. Bul. Soc. Nat. Agr.
France 66 (1): 32-38. Jan. 1906.
Statements made by Alexis Yermoloff with regard to the importance
of spring rains in the growth of crops in Russia are reported.
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- SAILLARD, EMILE. (1746)
LEETS THAT HAVE UNDERGONE FREEZING AND THAWING. Planter 76: 207-208.
Mar. 13, 1926.
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- ST. JOHN, J. L., AND MORRIS, O. M. (1747)
STUDIES OF QUALITY AND MATURITY OF APPLES. Jour. Agr. Research 39: 623-
639. Oct. 15, 1929.
"Such climatic factors as temperature, sunshine, and rainfall have a
decided effect upon quality of fruit and the variation of quality from year
to year."
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- SAJÓ, KARL. (1748)
METEOROLOGISCHE ANSPRÜCHE VON OIDIUM TUCKERI UND PERONOSPORA VITI-
COLA. Ztschr. Pflanzenkrank. 11: 93-95. June 29, 1901.
The meteorological conditions necessary for the development of certain
fungi are discussed.
-
- WEITERE MITTEILUNGEN ÜBER DIE METEOROLOGISCHEN ANSPRÜCHE DER SCHÄD-
LICHEN PILZE. Ztschr. Pflanzenkrank. 12: 151-157. July 15, 1902. (1749)
A further discussion of the meteorological conditions necessary for the
development of harmful fungi.

SALISBURY, E. J.

(1750)

THE GEOGRAPHICAL DISTRIBUTION OF PLANTS IN RELATION TO CLIMATIC FACTORS. Geogr. Jour. 67: 312-342. Apr., 1926.

The reaction of plants to temperature and rainfall is discussed.

SALMON, S. C.

(1751)

A PRELIMINARY NOTE ON SOIL MOISTURE AND TEMPERATURE FACTORS IN THE WINTER-KILLING OF GRAIN CROPS. Science (n. s.) 47: 173-174. Feb. 15, 1918.

Discusses the results of experiments made in Kansas to investigate the relation of soil and moisture to temperature in winter and to the winter survival of cereal crops.

(1752)

THE RELATION OF WINTER TEMPERATURE TO THE DISTRIBUTION OF WINTER AND SPRING GRAINS IN THE UNITED STATES. Jour. Amer. Soc. Agron. 9: 21-24. Jan., 1917.

The author discusses the growing of winter and spring grains in the United States with reference to temperature and shows that there is a lack of correlation between the northern limit of winter cereal culture and snowfall.

(1753)

SEEDING WINTER GRAINS IN FURROWS TO PREVENT WINTER KILLING. Jour. Amer. Soc. Agron. 8: 176-188. May-June, 1916.

"Since winter grains are generally preferred to spring grains, winter killing or winter injury is important (1) in limiting the area adapted to winter grains and (2) because of the large losses that frequently occur in areas where they are commonly grown . . . Seeding in furrows tends to prevent winter killing and damage from blowing in dry areas . . . and probably enables the plants to endure drought better than when sowed in the ordinary way."

(1754)

SOME FACTORS IN THE WINTERKILLING OF GRAIN CROPS. Kans. Acad. Sci. Trans. 28: 129-131. 1916-17.

Some results of investigations of the causes and possible means of preventing loss from winterkilling are given.

(1755)

WHY CEREALS WINTERKILL. Jour. Amer. Soc. Agron. 9: 353-380. Nov., 1917.

The effect of low temperature on plants is attributed to mechanical injury, desiccation of the protoplasm, chemical effects, and suspension of metabolism. The degree of injury may be modified by duration and intensity of cold, rate of freezing and thawing, protection afforded by mulches, snow, and uneven surface of the ground, the moisture content of the soil and its condition with respect to dormancy.

— and FLEMING, F. L.

(1756)

RELATION OF THE DENSITY OF CELL SAP TO WINTER HARDINESS IN SMALL GRAINS. Jour. Agr. Research 13: 497-506. June 3, 1918.

A study of the sap density of various small grains as one phase of a series of investigations conducted to determine the causes of winter-killing seems to show that there is "no relation between the cryoscopic value of the extracted sap of winter rye, wheat, emmer, barley and oats grown in the field with normal conditions and their ability to resist winterkilling . . . On the other hand, for tender plants of the same varieties grown in the greenhouse there appears to be a definite relation between the freezing point of the cell sap, the turgidity of the tissue, and resistance to low temperature."

SALTYKOVSKY, M. J.

(1757)

DAS FRÜHJAHRSAUSTERBEN DER WINTERGETREIDE. (Zhur. Opytn. Agron. Ħugo-Vostoka. (Jour. Expt. Landw. Südost. Eur.-Russlands) 6: 151-174. 1928.

In Russian with German summary.

Winter hardiness is discussed.

(1758)

WINTER HARDINESS OF WINTER PLANTS. (Zhur. Opytn. Agron. Ħugo-Vostoka. Jour. Expt. Landw. Südost. Eur.-Russlands) 7: 181-218. 1929.

In Russian with English summary.

SAMPSON, ARTHUR W.

(1759)

CLIMATE AND PLANT GROWTH IN CERTAIN VEGETATIVE ASSOCIATIONS . . . 72 p.
Washington, D. C., 1918. (U. S. Dept. Agr. Bul. 700.)

An account of investigations made in Utah to determine the relation of certain weather factors to growth, water requirements and other physiological functions of a certain variety of pea, wheat, and mountain brome grass.

SANDO, W. J.

(1760)

CLIMATE AND WHEAT YIELDS AT COLLEGE PARK, MD. Jour. Amer. Soc. Agron.
15: 400-408. Oct., 1923.

"The results obtained indicate the importance of low rainfall during the months of March and May for the successful growth of [four] varieties of winter wheat at College Park, Md. . . . No definite relation seems to exist between yields of the varieties studied and other climatic factors such as snowfall, temperature, and sunshine."

(1761)

THE CRITICAL PERIOD OF WHEAT AT COLLEGE PARK, MD. U. S. Mo. Weather
Rev. 49: 301. May, 1921.

This is the author's abstract of a paper presented before the American Meteorological Society, in Washington, D. C., April 20, 1921.

A study was made with four varieties of wheat, covering a period of 12 years. "A significant negative correlation was found between precipitation and yield for March and May. No significant correlation could be found between temperature and yield. In the discussion of Mr. Sando's paper it was stated by C. F. Brooks that a tabulation of wheat yields and corresponding rainfall in different parts of the United States showed that the best yields were obtained with about 30 inches of annual rainfall, and that the yields where the rainfall was over 50 inches were about as poor as in the regions where the rainfall was less than 15 or 10 inches a year."

SANDSTEN, E. P.

(1762)

CONDITIONS WHICH AFFECT THE TIME OF THE ANNUAL FLOWERING OF FRUIT
TREES. 21 p. Madison, 1906. (Wis. Agr. Expt. Sta. Bul. 137.)

"From the data presented it would appear that there is but little relationship between the time of flowering and the temperature in the spring, up to the time of flowering, while there appears to be considerable evidence that the temperature and other climatic conditions during summer and fall preceding flowering have much to do with the time of flowering."

(1763)

WINTER KILLING OF APPLE TREES IN COLORADO. Fruit Belt 24 (3): 18.
Mar., 1926.

SANSON, JOSEPH.

(1764)

LES APPLICATIONS PRATIQUES DE LA MÉTÉOROLOGIE À L'AGRICULTURE. Grande
Rev. Agr. 5: 519-532. Mar., 1928.

Translated and summarized by W. R. Black. Jour. Min. Agr. [Gt. Brit.] 35: 618-626. Oct., 1928. Reprinted in Queensland Agr. Jour. 31 (pt. 1): 77-85. Jan., 1929.

Gives a historical account of the methods of weather forecasting for the benefit of agriculturists, discusses the application of climatology in the improvement of crops, makes a more detailed study of the influence of rain in agriculture, and correlates rainfall and the yield of wheat for the central region of France.

(1765)

LES EFFETS DES GELÉES DU MOIS DE DÉCEMBRE 1927 SUR LES ENSEMENCEMENTS
DES CÉRÉALES EN FRANCE. Compt. Rend. Acad. Agr. France. 14: 592-
600. May 2, 1928.

Also appeared in Grande Rev. Agr. Aug., 1928, p. 1061-1065.

A study is made of the effect of the severe frost of December, 1927, on cereals in France.

(1766)

LES EFFETS DES GELÉES DU MOIS DE DÉCEMBRE 1927 SUR LES ENSEMENCEMENTS
DES CÉRÉALES EN FRANCE. Météorologie (n. s.), 4: 300-304. July, 1928.

The minimum temperature is found at which cereals can resist cold with and without snow on the ground.

- SANSON, JOSEPH—Continued. (1767)
L'INFLUENCE DES GELÉES D'OCTOBRE 1925 SUR LA RÉCOLTE DES RAISINS EN TOURAINE. *Météorologie* (n. s.) 2: 125-127. Mar., 1926.
Contains a brief account of the harmful effect of the frosts of October 1925 on the grape harvest in Touraine.
-
- LES INFLUENCES MÉTÉOROLOGIQUES DES MOIS D'AVRIL, MAI ET JUIN SUR LE RENDEMENT DES BLÉS DANS LE CENTRE DE LA FRANCE. *Compt. Rend. Acad. Agr. France*, 12: 1054-1058. Dec. 22, 1926. (1768)
The relation between temperature and rainfall from April to June and the yield of wheat in the center of France is briefly discussed.
-
- LES PARTICULARITÉS MÉTÉOROLOGIQUES DE L'ANNÉE AGRICOLE 1928-1929 DANS LA RÉGION PARISIENNE. *Vie Agr. et Rurale* 18: 369-371. Dec. 15, 1929. (1769)
The author discusses the effect on vegetation of excessively low and high temperatures, insolation, and a long period of drought experienced in the neighborhood of Paris during the crop year 1928-29.
-
- LA RADIATION ET L'INSOLATION AU POINT DE VUE AGRICOLE. *Vie Agr. et Rurale* 19: 309-311. May 11, 1930. (1770)
The necessity of determining the value of radiant energy in agricultural operations is stressed, and instruments for its measurement are described.
-
- RELATIONS ENTRE LE CARACTÈRE MÉTÉOROLOGIQUE DES SAISONS ET LE RENDEMENT DES RÉCOLTES DE BLÉ EN SEINE-ET-OISE. *Compt. rend. Acad. Agr. France* 15: 918-923. Nov. 6, 1929. (1771)
A study covering the years 1900 to 1929 is made of the influence of rainfall, temperature, and insolation on the yield of wheat in the Department of Seine-et-Oise.
-
- RELATIONS ENTRE LE CARACTÈRE MÉTÉOROLOGIQUE DES SAISONS ET LES RENDEMENTS DES RÉCOLTES DE CÉRÉALES DANS LE DÉPARTEMENT DE SEINE-ET-OISE. *Vie Agr. et Rurale* 18: 177-180. Sept. 22, 1929. (1772)
This is a study of the effect of rainfall, temperature, and sunshine on wheat and oats in the Department of Seine-et-Oise.
-
- LA SÉCHERESSE DE L'ÉTÉ 1928 ET SES RÉPERCUSSIONS SUR LES PRINCIPALES CULTURES. *Bul. Agr. Paris* 48: (1851): 27-29. Nov., 1928. (1773)
A discussion of the effect on the principal crops of the drought of the summer of 1928.
-
- SARLE, CHARLES F. (1774)
FORECASTING THE PRICE OF HOGS. *Amer. Econ. Rev.*, v. 15, no. 3, Sup. 2, 22 p. Sept., 1925.
The price of hogs depends largely on the price of corn. "The price of corn at a given time depends primarily upon the supply. Supply is determined principally by the weather."
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- SARTORIS, GEORGE B. (1775)
DETERIORATION IN P. O. J. CANES. *Sugar* 31: 144-146, 196-197. 1929.
"The outstanding result of the experiments is the evidence presented that the P. O. J. varieties, 36, 213, 234, and 826, will withstand the average winter conditions in Louisiana without appreciable loss in their sucrose content."
-
- DATE OF DETERIORATION OF SUGAR CONTENT OF SOME P. O. J. SUGARCANE VARIETIES IN LOUISIANA. 27 p. Washington Govt. Print. Off. 1929. (U. S. Dept. Agr. Circ. 97.) (1776)
The cold resistance of some varieties of sugarcane grown in Louisiana is discussed.
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- SAYAD, L. A. (1777)
THE EFFECT OF CLIMATE ON THE GROWTH OF PLANTS USING ALL ECOLOGICAL OBSERVATIONS IN NATURE. *Poona Col. Mag.* 19: 146-152. Dec., 1927.
Not seen.

- SAYRE, JASPER D. (1778)
THE DEVELOPMENT OF CHLOROPHYLL IN SEEDLINGS IN DIFFERENT RANGES OF WAVE LENGTHS OF LIGHT. *Plant Physiol.* 3 (1): 71-79. Jan., 1928.
"Wave lengths of radiant energy is longer than 680 M μ are not effective in the formation of chlorophyll in seedlings of corn, wheat, oats, barley, beans, sunflowers, and radish."
-
- OPENING OF STOMATA IN DIFFERENT RANGES OF WAVE LENGTHS OF LIGHT. *Plant Physiol.* 4: 323-328. July, 1929. (1779)
- SCARAMUZZI, DONATO. (1780)
CONTRIBUTO ALL STUDIO DEI DANNI DEL GELO. *Ital. Agr.* 66: 263-277. May, 1929.
The author discusses the effect of frost on fruit trees following a dry summer and a wet autumn.
- SCHAEFER, ERNST. (1781)
BEOBACHTUNGEN ÜBER DIE WIRKUNGEN DER DIESJÄHRIGEN DÜRRE. *Pflanzenbau Halbmonatschr. Saatwesen, Anbau u. Pflege der Kulturpflanzen* 2: 106-108. Oct. 1, 1925.
The results of a dry summer on grain, legumes, and beet root are briefly discussed.
- SCHAFFNER, JOHN H. (1782)
CHANGE OF OPPOSITE TO ALTERNATE PHYLLOTAXY AND REPEATED REJUVENATIONS IN HEMP BY MEANS OF CHANGED PHOTOPERIODICITY. *Ecology* 7: 315-325. July, 1926.
-
- CONTROL OF SEX REVERSAL IN THE TASSEL OF INDIAN CORN. *Bot. Gaz.* 84: 440-449. Dec., 1927. (1783)
"Narrow-grain Evergreen sweet corn is decidedly influenced in its sexual expression by the length of the daily illumination period."
-
- ECOLOGICAL DETERMINATION OF TWISTED HYPOCOTYL AND OTHER PECULIAR EXPRESSIONS IN HEMP. *Amer. Nat.* 64: 367-379. July, 1930. (1784)
Not seen.
-
- FURTHER EXPERIMENTS IN REPEATED REJUVENATIONS IN HEMP AND THEIR BEARING ON THE GENERAL PROBLEM OF SEX. *Amer. Jour. Bot.* 15: 77-85. Jan., 1928. (1785)
A further study of rejuvenation in hemp produced by means of illumination.
-
- INFLUENCE OF ENVIRONMENT ON SEXUAL EXPRESSION IN HEMP. *Bot. Gaz.* 71: 197-219. Mar., 1921. (1786)
-
- THE INFLUENCE OF RELATIVE LENGTH OF DAYLIGHT ON THE REVERSAL OF SEX IN HEMP. *Ecology* 4: 323-334. Oct., 1923. (1787)
Experiments carried on with hemp show "that the ecological factor of relative length of daylight has a profound effect on the plant, not only in changing its size and complexity, its period of vegetative growth and maturity, and its conditions of senility and rejuvenescence, but also in determining the nature of its sexual expression."
- SCHAFFNER, E. (1788)
STUDIEN ÜBER DEN EINFLUSS NIEDERER TEMPERATUREN AUF DIE PFLANZLICHE ZELLE. *Mitt. Kaiser Wilhelms Inst. Landw.* 3: 93-115. Nov., 1910.
Abstract in *Expt. Sta. Rec.* 24: 533. May, 1911.
"The effects of low temperatures on the cell sap, chemical constituents, enzymes, physical changes and death points of green plants, spores and pollen grains are discussed."
-
- ÜBER DEN EINFLUSS NIEDERER TEMPERATUREN AUF DIE PFLANZLICHE ZELLE. *Ztschr. Allg. Physiol.* 12: 323-336. 1911. (1789)
The influence of low temperature on plant cells is discussed.
- SCHANDER, RICHARD. (1790)
DIE BERÜCKSICHTIGUNG DER WITTERUNGSVERHÄLTNISSE IN DEN BERICHTEN ÜBER PFLANZENSCHULTZ DER HAUPTSAMMELSTELLEN FÜR PFLANZENKRANKHEITEN. *Jahresber. Ver. Angew. Bot.* 9: 1-22. 1911.
The importance of weather conditions in plant pathology is stressed.

- SCHANDER, RICHARD—Continued. (1791)
 ÜBER HAGELBESCHÄDIGUNGEN AN ROGGEN, WEIZEN, GERSTE UND HAFER. Füh-
 lings Landw. Ztg. 63: 657-703. Nov., 1914.
 The damage done by hail to rye, wheat, barley, and oats before, during,
 and after flowering is studied.
- and SCHAFFNIT, E. (1792)
 UNTERSUCHUNGEN ÜBER DAS AUSWINTERN DES GETREIDES. Landw. Jahrb. 52:
 1-66. 1918.
 The effect of low temperature on grain is discussed.
- SCHANZ, FRITZ. (1793)
 EINFLUSS DES LICHTES AUF DIE GESTALTUNG DER VEGETATION. Ber. Deut. Bot.
 Gesell. 36: 619-632. 1918.
 A technical discussion of the effect of light on plants.
- (1794)
 WIRKUNGEN DES LICHTS AUF DIE PFLANZE. Biol. Centbl. 38: 283-296. July,
 1918.
 Translated in Sci. Amer. Mo. 1: 12-16. Jan., 1920.
 "In the higher mountain regions we have a low form of vegetation
 of particularly vigorous growth. This form of growth is conditioned
 by the large quantities of rays of short wave length which act upon the
 plants in such regions. As we descend toward sea level this stimulus
 diminishes, and plants increase in the length of their growth in direct
 proportion to this diminution. It can not be denied that other influences,
 such as temperature, humidity, and air currents are likewise operative,
 but, in my opinion, light is so powerful a factor as far to surpass all
 others in importance."
- SCHAPFRINGER, I. J. (1795)
 CLIMATE AND SUGAR BEET. Brit. Beet Grower 1 (1): 4-5. Sept. 20, 1927.
 Not examined.
 Reprint in [Gt. Brit.] Min. Agr. and Fisheries, Mo. Crop Weather
 Rpts. v. 3, no. 4, Jan., 1927.
 "The deciding factors as far as climate is concerned can be grouped
 under the following headings: (a) rainfall or humidity; (b) tempera-
 ture or heat; (c) hours of daylight during the growing season;
 (d) wind."
- SCHARFETTER, RUDOLF. (1796)
 PHENOLOGY AND AGRICULTURE. Internatl. Rev. Sci. and Pract. Agr. (n. s.)
 1: 561-572. July-Sept., 1923.
 A few examples are given which suggest the large variety of problems
 connected with phenology, regarded as "the study of periodical develop-
 ment in plants in conjunction with annual climatic phenomena. The
 science of phenology promises many important discoveries in connection
 with possibilities in foreign-plant cultivation and holds the key to the
 origin of innumerable varieties of plant life which abound in our fields
 and meadows."
- SCELLENBERG, A. (1797)
 DIE FRÜHJAHR-UND WINTERFROSTSCHÄDEN IN DEN ZÜRCHERISCHEN REBBERGEN
 DER JAHRE 1926, 1927, 1928, UND 1929. Landw. Jahrb. Schweiz 44:
 81-124. 1930.
 A study of the effect of frost on vines, illustrated by the damage done
 in the winter and spring of the years 1926 to 1929, inclusive.
- SCHENK, P. J. (1798)
 ZONNEBRAND. Floralia 47: 586-587. Sept. 17, 1926.
 The effect of sun scald is briefly discussed.
- SCHIPPER. (1799)
 FROSTPLATTEN UND FROSTRISSE AN OBSTBÄUMEN. Gartenwelt 30: 310-311.
 May 14, 1926.
 A brief reference to the effect of frost on fruit trees.
- (1800)
 DIE HAGEL-UND FUSIKLADIUM-EMPFINDLICHKEIT UNSERER OBSTSORTEN. Gar-
 tenwelt 29: 95-96. Feb. 6, 1925.
 A brief account of the effect of hail on fruit trees.
- SCHLOSS, BETTY. (1801)
 DER LICHTSINN DER PFLANZEN. Naturw. Wchnschr. (N. F.) 18: 265-270.
 1903.
 The reaction of plants to light is studied.

- SCHMIDT. (1802)
 VEGETATIONSVERSUCHE ZUM ERTRAGSAKTOR LICHT. Ztschr. Forst-u. Jagdw.
 56: 461-472. Aug., 1924.
 A discussion of the influence of light on forest growth.
- SCHMIEDER, RUDOLF. (1803)
 DER EINFLUSS DES KLIMAS AUF DIE LANDWIRTSCHAFT IN THÜRINGEN. 119 p.
 Weimar, 1928.
 Inaug.-diss. Leipzig.
 The climatology of Thuringia is discussed in relation to the utilization
 of the soil for crop and animal production and to farm management.
- SCHMOOK, ALEXANDER. (1804)
 REFLEKTIERTE HITZESTRAHLEN. Deut. Forst. Ztg. 43: 274-275. Mar. 9, 1928.
 A brief account of the effect of reflected heat rays as observed on beets.
- SCHNEIDERHAN, FELIX J. (1805)
 APPLE DISEASE STUDIES IN NORTHERN VIRGINIA. 35 p. Blacksburg. 1926.
 (Va. Agr. Exp. Sta. Bul. 245.)
 Some effects of weather on apple diseases are noted. (1806)
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- RAINFALL IN RELATION TO ASCOSPORE DISCHARGE AND INFECTION IN VENTURIA
 INAEQUALIS. (Abstract) Phytopathology 15: 56. Jan., 1925.
 Abstract of a paper presented at the sixteenth annual meeting of the
 American Phytopathological Society, Washington, D. C., Dec. 30, 1924-
 Jan. 1, 1925.
 A study is made of the effect of rainfall on the apple-scab fungus in
 Virginia.
- SCHNEIDEWIND. (1807)
 KÖRNER- UND KARTOFFELERTRÄGE AUF LEICHTESTEM SANDBODEN. Deut. Landw.
 Presse 45: 287-288. June 8, 1918.
 The response of grain and potatoes to rainfall is briefly discussed.
- SCHNEIDEWIND, W., and others. (1808)
 DER EINFLUSS DER NIEDERSCHLÄGE AUF HÖHE UND QUALITÄT DER ERNTEN.
 Landw. Jahrb. 36: 574-581. 1907.
 Abstract in Expt. Sta. Rec. 19: 512. Feb., 1908.
 "Observations during the period 1896 to 1906 on the influence of
 precipitation on (1) the yield of crops in general, (2) the yield of indi-
 vidual crops, and (3) the quality of the crops, are summarized and
 discussed."
- SCHNIDER, A. (1809)
 DER EINFLUSS DER KLIMATISCHEN LAGE AUF DEN LANDWIRTSCHAFTSBETRIEB IN
 DEUTSCHLAND. 27 p. Berlin, P. Parey, 1912. (Landwirtschaftliche
 Hefte, hrsg. v. Dr. L. Kiessling, no. 1)
 The author discusses the relation of different climatic factors to
 various farm operations.
- SCHRAMMEN, FRANZ R. (1810)
 ÜBER DIE EINWIRKUNG VON TEMPERATUREN AUF DIE ZELLEN DES VEGETATIONS-
 PUNKTES DES SPROSSES VON VICIA FABA. Verhandl. Naturhist. Ver. Preuss.
 Rheinlande u. Westfalens 59: 49-98. 1902.
 The effect of temperature on shoots of Vicia faba is discussed.
- SCHREIBER, PAUL. (1811)
 METEOROLOGICAL OBSERVATIONS CONSIDERED WITH SPECIAL REFERENCE TO IN-
 FLUENCE ON VEGETATION. U. S. Dept. Agr., Weather Bur. Bul. 11:
 395-404. 1894.
 The author discusses the necessity of heat, water, and sunshine to
 plants and their distribution during the various phases of plant life.
- SCHRENK, HERMANN VON. (1812)
 GLASSY FIR. Missouri Bot. Gard. Ann. Rpt. 16: 117-120. 1905.
 Glassy fir as a result of low temperature is discussed. (1813)
-
- ON FROST INJURIES TO SYCAMORE BUDS. Missouri Bot. Gard. Ann. Rpt. 18:
 81-83. 1907.
 Describes frost injuries to sycamore buds in the spring of 1907.
- SCHREIBAU, EMILE.
 LES BLÉS À GRANDS RENDEMENTS ET LE FROID. Vie Agr. et Rurale 30 (4):
 58-59. Jan. 23, 1927.

SCHRIBUAX, ÉMILE—Continued.

(1815)

LES BLÉS ET LE FROID À LA STATION D'AMÉLIORATION DES PLANTES DE DIJON.
Compt. Rend. Acad. Agr. France 14: 230-235. Feb. 15, 1928.

The results are given of experiments made at Dijon to test the cold resistance of wheat.

(1816)

UN GRAVE DANGER À CONJURER: LA DESTRUCTION DES BLÉS À GRANDS RENDEMENTS ACTUELLEMENT CULTIVÉS, EN CAS D'HIVER RIGOUREUX. Inst. Nat. Agron., Assoc. Amicale des Anciens Élèves. Les Problèmes Agricoles. no. 1, p. 34-38. 1926.

(1817)

INFLUENCE DES ENGRAIS SUR LA RÉSISTANCE AU FROID DU SEIGLE D'HIVER.
Compt. Rend. Acad. Agr. France 15: 571-574. May 1, 1929.

A study of the effect of fertilizer on cold resistance of winter rye.

SCHROEDER, H.

(1818)

DIE PFLANZE IM WECHSEL DER JAHRESZEITEN. Naturw. Wehnschr. (N. F.) 19: 52-59. Jan. 25, 1920.

The influence of weather conditions on rest periods of plants is briefly discussed.

SCHUBERT, J., and DENGLER, A.

(1819)

KLIMA UND PFLANZENVERBREITUNG IM HARZ. 36 p. Eberswalde, 1909.

Abstract in Expt. Sta. Rec. 24: 126. Feb., 1911.

Observations on variations of temperature, pressure, and rainfall with elevation and on plant distribution with relation to these variations are briefly recorded.

SCHULZE, R.

(1820)

[DEPENDENCE OF YIELD AND SUGAR CONTENT OF SUGAR BEETS ON WEATHER FACTORS.] Zuckerrübenbau 11: 185-192. Nov., 1929.

Abstract in Facts about Sugar 24: 1162, 1929; Expt. Sta. Rec. 62: 712-713. June, 1930.

Not seen.

"Correlating the meteorological data for 27 years in the beet-growing district east of the Saale River in Bavaria with the yield and sugar content of the beets, it was found that the 'critical period' for this district is July-September, a rainfall of over 7 inches during this period being necessary for the maximum crop. Abundant rainfall with relatively low temperature and sunshine appeared to be the conditions giving the highest gross yield, but abundant sunshine (a daily average of more than 4.43 hours) in September and October was correlated with high sugar content."

SCOTT, WINFIELD.

(1821)

WHAT IS THE RELATION BETWEEN THE MOISTURE CONTENT AND VIABILITY OF SEED CORN WHEN SUBJECTED TO LOW TEMPERATURES? Iowa Acad. Sci. Proc. 30: 254-257. 1923.

"In general we are safe in saying that the percentage of germination decreases as the percentage of moisture rises above 30 per cent and the length of the freezing period passes 12 hours if a constant temperature of 12° C. below zero is maintained."

SEELEY, DEWEY A.

(1822)

THE CLIMATE OF MICHIGAN AND ITS RELATION TO AGRICULTURE. Mich. Agr. Expt. Sta. Ann. Rpt. 30: 683-715. 1916-17.

The author discusses the effect of temperature, rainfall, cloudiness, wind, and humidity on the yield of crops in Michigan.

(1823)

THE GREAT GLAZE STORM OF FEBRUARY 21-23, IN MICHIGAN. U. S. Mo. Weather Rev., 50: 80-82. Feb., 1922.

Gives general estimates from various observers in Michigan of the damage done to trees.

(1824)

THE LENGTH OF THE GROWING SEASON IN MICHIGAN. Mich. Acad. Sci. Ann. Rpt. 20: 223-232. 1918.

The risk from frost damage to crops in Michigan is pointed out. "The records of frosts during the past 30 years or more, as compiled at many points in the State by the United States Weather Bureau, have been studied and mathematical calculations made to determine the risk from

SEELEY, DEWEY A.—Continued.

frost damage on certain dates, at places in the State where records for twenty or more years are available for study." The results are given in three tables.

(1825)

NOTE ON THE HEATING OF PLANTS IN SUNLIGHT AS A FACTOR IN GROWTH. U. S. Mo. Weather Rev. 47: 327-328. May, 1919.

(1826)

THE RELATION BETWEEN TEMPERATURE AND CROPS. Mich. Acad. Sci. Ann. Rpt. 19: 167-195. 1917.

The author shows that plant temperature should be taken into account in any study of the relation between temperature and plant growth. He outlines a method of study which he considers superior to the temperature summation methods, "especially if some system such as Livingston's method of indices is used in connection therewith to correlate plant growth and the effective temperatures thus found."

(1827)

RELATION BETWEEN TEMPERATURE AND CROPS. U. S. Mo. Weather Rev. 45: 354-359. July, 1917.

The author makes suggestions as to methods of evaluating air-temperature records in relation to the heat requirements of crops.

SEELHORST, C. V.

(1828)

DIE BEDEUTUNG DES WASSERS IM LEBEN DER KULTURPFLANZEN. Jour. Landw. 59: 259-291. 1911.

This is a study of the importance of water to cultivated plants. Certain conclusions are drawn with regard to rotation of crops.

SEIDE, J.

(1829)

PERIODIZITÄT UND RHYTHMUS IN DEN LEBENS VORGÄNGEN VON TIER UND PFLANZE. Naturforscher 5: 394-398. Dec., 1928.

A brief account of plant periodicity.

SEIFRIZ, WILLIAM.

(1830)

THE LENGTH OF THE LIFE CYCLE OF A CLIMBING BAMBOO. A STRIKING CASE OF SEXUAL PERIODICITY IN CHUSQUEA ABIETIFOLIA GRISEB. Amer. Jour. Bot. 7: 83-94. Mar., 1920.

The possible relationship between rainfall and temperature and the life cycle of the Chusquea is considered.

(1831)

OBSERVATIONS ON THE CAUSES OF GREGARIOUS FLOWERING IN PLANTS. Amer. Jour. Bot. 10: 93-112. Feb., 1923.

Discusses drought as a cause of gregarious flowering in bamboos and palms and concludes that its effect is relatively slight.

SEKIGUCHI, R.

(1832)

SOME CORRELATIONS BETWEEN THE SOLAR ACTIVITY AND THE FAR EASTERN CLIMATES. Jour. Met. Soc. Japan 37: 33-42, 55-58. 1918.

Correlations between sun spots and temperature, rainfall, and cyclones are discussed.

SELBY, AUGUSTINE D.

(1833)

FALL AND EARLY WINTER INJURIES TO ORCHARD TREES AND SHRUBBERY BY FREEZING. p. 129-148. Wooster, 1908. (Ohio Agr. Expt. Sta. Bul. 192.)

This is a study of injuries to fruit trees from freezing during the autumn of 1906 and the winter of 1906-7.

(1834)

ON THE OCCURRENCE OF PHYTOPHTHORA INFESTANS MONT. AND PLASMOPORA CUBENSIS (B. & C.) HUMPH. IN OHIO. Ohio Nat. 7 (4): 79-85. Feb., 1907.

The weather factors conducive to the outbreak of these fungi, parasites, respectively, of the potato and the cucumber, are discussed.

SELICK, N. P.

(1834a)

MAIZE AND METEOROLOGY. Rhodesia Agr. Jour. 27: 962-969. Sept., 1930.

Correlation of maize yield with weather factors shows a marked effect of rainfall and sunshine on yield.

SELLSCHOP, J. P. F., and SALMON, S. C.

(1835)

THE INFLUENCE OF CHILLING, ABOVE THE FREEZING POINT, ON CERTAIN CROP PLANTS. Jour. Agr. Research 37: 315-338. 1928.

"The authors investigated the effect of temperature near, but above, the freezing point on certain crop plants, and where injury was found to occur studies were made as to the susceptibility of the plants and the circumstances under which injury took place."

- SEMADENI, K. I., and GAUER, W. K. (1836)
THE RELATION OF THE YIELD OF APPLES TO PRECIPITATION DURING 1901 TO 1908. *Trudy Selsk. Khoz. Met.* No. 5, I, p. 20-26. 1909.
Not examined. Reference given as found.
Abstract in *Expt. Sta. Rec.* 23: 118. Aug., 1910.
"During the six years under observation good and bad yields of apples alternated. The general conclusions of the author follow: (1) The size of a full crop (good yield) is in direct correspondence with the amount of precipitation during the vegetation year preceding the crop; (2) in like correspondence with the precipitation are the short crops (bad yields); (3) the chief rôle is played by the precipitation during the preceding period of vegetative activity (from the thawing of the soil in the spring to its freezing in the beginning of the winter)."
- SETCHELL, WILLIAM A. (1837)
TEMPERATURE AND ANTHESIS. *Amer. Jour. Bot.* 12: 178-188. Mar., 1925.
A study of the blooming period of plants on Mt. Tamalpais indicates that anthesis is dependent upon temperature rather than upon moisture or hours of daylight and that there is a critical temperature for anthesis.
- SEVERE INJURY TO FRUIT TREES AS A RESULT OF THE WINTER OF 1917-18. *Jour. Agr. and Hort.* [Quebec] 22: 193. May, 1919. (1838)
- SEYMOUR, E. L. D. (1839)
WHY DO PLANTS "REST"? *Florists Exch.* 55: 129, 161. Jan. 20, 1923.
Account of Doctor Coville's work on stimulating effect of cold.
- SHAMEL, A. D., SCOTT, L. B., and POMEROY, C. S. (1840)
FROST PROTECTION IN LEMON ORCHARDS. 30 p. Washington, D. C., 1920. (U. S. Dept. Agr. Bul. 821.)
The effect of low temperatures on lemon trees in California in December, 1912, and January, 1913, is studied.
- SHANNON, I. V. (1841)
THE COTTON OUTLOOK. *Com. and Finance* 17: 1967-1969. Sept. 12, 1928.
"It is a generally accepted view that a wet, cloudy June, July, and August means a large weevil damage and a small crop; while dry sunshiny weather during the same months will reduce weevil damage to negligible proportions and produce a large yield." Government charts. published in 1925, are given based on studies in Louisiana covering the years from 1900 to 1922. They show the effect on the yield of cotton of variations in the weather from normal.
- SHANTZ, HOMER L. (1842)
THE EFFECTS OF ARTIFICIAL SHADING ON PLANT GROWTH IN LOUISIANA. 29 p. Washington, D. C., 1913. (U. S. Dept. Agr. Bur. Plant Indus. Bul. 279.)
The author "describes experiments with various crop plants which were grown under artificial shades of different degrees of density, the purpose being to determine the effect of diminished light intensity upon the growth of plants. In nearly every case a moderate reduction in the intensity of the light resulted in an increased growth as compared with plants of the same species growing in the open. It was also observed that in the case of lettuce the quality was improved by a moderate degree of shade."
- SHAPOVALOV, MICHAEL. (1843)
ECOLOGICAL ASPECTS OF A PATHOLOGICAL PROBLEM. (WESTERN YELLOW BLIGHT OF TOMATOES) *Ecology* 6: 241-259. July, 1925.
It is shown that the prevalence of the western yellow blight of tomatoes is largely due to climatic factors that increase the evaporating power of the air, particularly high temperature, in conjunction with low humidity.
- (1844)
EFFECT OF ENVIRONMENT ON WESTERN YELLOW BLIGHT OF TOMATOES. (Abstract.) *Phytopathology* 14: 120-121. Feb., 1924.
Abstract of a paper presented at the seventh annual meeting of the Pacific division of the American Phytopathological Society, Los Angeles, Calif., Sept., 1923.
"The disease tends to assume alarming proportions in localities and seasons characterized by a relatively high temperature, low humidity and high evaporation and is of little or no significance where and when the humidity is high and the temperature and the evaporation are low."

- SHAPOVALOV, MICHAEL—Continued. (1845)
 HIGH EVAPORATION: A PRECURSOR AND A CONCOMITANT OF WESTERN YELLOW TOMATO BLIGHT. *Phytopathology* 15: 470-478. Aug., 1925.
 In 1924 a severe outbreak of yellow tomato blight in a number of widely separated regions of the Western States coincided with an unusually high evaporation in those regions. This condition was due mainly to a lower relative humidity and a greater wind movement.
- SHAW, CHARLES H. (1846)
 THE CAUSES OF TIMBER LINE ON MOUNTAINS: THE RÔLE OF SNOW. *Plant World* 12: 169-181. Aug., 1909.
 Two kinds of timber lines are recognized, those caused by wind and those caused by snow.
- SHAW, G. W. (1847)
 STUDIES UPON INFLUENCES AFFECTING THE PROTEIN CONTENT OF WHEAT. *Calif. Univ. Pub. Agr. Sci.* 1: 63-126. Oct. 23, 1913.
 The author shows that the protein content of wheat is influenced by the percentage of sunshine which the grain receives during its period of growth and to an even greater degree by the rainfall during the later growing period of the crop.
- SHAW, HARRY B. (1848)
 CLIMATIC CONTROL OF THE MORPHOLOGY AND PHYSIOLOGY OF BEETS. *Sugar* 19: 387-390, 431-434, 479-484. 1917; 20: 23-27, 68-70, 109-112, 150-153. 1918.
 "The experiments described have shown a close correlation between climatic conditions and the morphological development of beets, whether wild or in cultivation."
- SHAW, J. K. (1848a)
 CLIMATIC ADAPTATIONS OF APPLE VARIETIES. *Mass. Agr. Expt. Sta. Ann. Rpt.* 23: 177-245. Jan., 1911.
 Contains a study of the effect of temperature on the growth and ripening of apples.
- (1848b)
 VARIATION IN APPLES. *Mass. Agr. Expt. Sta. Ann. Rpt.*, 22 (pt. 1): 194-213. Jan., 1910.
 This paper deals entirely with the variability of the Ben Davis apple. Variations due to weather conditions are strongly marked. The variation in size is chiefly due to humidity or temperature, and the variation in quality to temperature.
- SHAW, J. W. (1849)
 THE CULTIVATION OF OATS IN NEW SOUTH WALES. *Ag. Gaz. N. S. Wales* 25: 1013-1022. Dec. 2, 1914.
 "Oats may be grown with a fair amount of success under a diversity of climatic conditions, but they thrive best in a cold climate, associated with a good rainfall that is evenly distributed throughout the crop-growing season . . . In a general way it can be said that a good potato district will, as a rule, prove suitable for growing oats, as these crops require similar conditions of climate."
- SHAW, NAPIER. (1850)
 THE AIR AND ITS WAYS. 237 p. London, Cambridge university press, 1923.
 Section 12, p. 170-180. Law of Sequence in the Yield of Wheat for Eastern England, 1885-1905. Reprinted from *Jour. Agr. Sci. [England]* v. 2, pt. 1, Jan., 1907.
 Section 13, p. 181-215. Meteorology and Agriculture. The importance of meteorology for agriculture is discussed.
- SHAW, W. N. (1851)
 AN APPARENT PERIODICITY IN THE YIELD OF WHEAT FOR EASTERN ENGLAND. 1885 to 1905. *Roy. Soc. [London] Proc., Ser. A*, 78 (A521): 69-76. 1906.
 This study would seem to reveal the existence of an 11-year period in the yield of wheat in Eastern England. "It is clear that the rainfall is subject to no such rigorous law of sequence as the wheat crop. A relation between the autumn rainfall and the wheat crop is sufficiently manifest, but evidently the fall of rain is subject to disturbances of an irregular character which have little counterpart in the curve of wheat values."

SHAW, W. N.—Continued. (1852)

THE LAW OF SEQUENCE IN THE YIELD OF WHEAT FOR EASTERN ENGLAND. 1885-1904. Met. Ztschr. Hann-Bd. p. 208-216. 1906.

This paper was contributed to the volume of the Meteorologische Zeitschrift which was issued in 1906 in honor of Dr. Julius Hann, its editor for 40 years. From a study of the rainfall and its connection with the amount of the harvest, the author derived a formula according to which the fluctuations of the latter are periodic, the period being 11 years.

(1853)

THE LAW OF SEQUENCE IN THE YIELD OF WHEAT FOR EASTERN ENGLAND, 1885-1905. Jour. Agr. Sci. [England] 2 (pt. 1): 17-28. Jan., 1907.

It would seem that "a good wheat yield is preceded by a dry and warm autumn, a rather dry and warm winter, a rather wet and cold spring, and a dry and slightly warm summer, while a bad wheat year has, on the other hand, a wet autumn of average temperature, a wet and cold winter, a dry and warm spring, and a moist warm summer."

(1854)

METEOROLOGY AND AGRICULTURE. Jour. Scot. Met. Soc. (3) 16 (29): 18-26. 1911.

The author points out the practical advantage to the farmer of a knowledge of the effect of weather on crops.

(1855)

ON A RELATION BETWEEN AUTUMNAL RAINFALL AND THE YIELD OF WHEAT OF THE FOLLOWING YEAR—PRELIMINARY NOTE. Roy. Soc. [London] Proc. 74: 552-553. 1905.

"It appears . . . that the dryness of autumn is the dominant element in the determination of the yield of wheat of the following year."

(1856)

THE RELATION OF WEATHER TO AGRICULTURE. Jour. Bd. Agr. [London] 19: 366-367. Aug., 1912.

This is a brief summary of a paper read at a conference of agricultural teachers held at Cambridge in July, 1912. The author "estimated that losses due to 'tempests' (that is, unfavourable weather conditions) are at least £20,000,000 annually, and that if even a small fraction of that loss could be prevented by the intelligent use of forecasts of the weather, the gain to the country at large would be immense . . . It appears that the yield of wheat depends to a great extent on the amount of the previous autumn's rainfall. Further, there appears to be a cycle of 11 years with regard to average wheat yield."

(1857)

SEASONS IN THE BRITISH ISLES FROM 1878. Jour. Roy. Statis. Soc. 68: 247-313. June, 1905.

Attention is drawn to the importance of the rainfall in autumn with regard to the yield of wheat in the following summer.

SHEARD, CHARLES, and JOHNSON, A. FRANCES. (1858)

THE EFFECTS OF INFRA-RED, VISIBLE, AND ULTRA-VIOLET IRRADIATION ON CHANGES IN ELECTRICAL POTENTIALS AND CURRENTS IN PLANTS. Science (n. s.) 71: 246-248. Feb. 28, 1930.

It is concluded that "the phenomenon of growth is evidenced, in part at least, by changes in electromotive force, and is largely dependent on and stimulated by the ultra-violet and infra-red regions of sunlight. The visible portions of sunlight are used, in all probability, for the development of chlorophyll."

— and others.

(1859)

THE GERMINATION OF SEEDS, GROWTH OF PLANTS, AND DEVELOPMENT OF CHLOROPHYLL AS INFLUENCED BY SELECTIVE SOLAR IRRADIATION. Science (n. s.) 71: 291-293. May 14, 1930.

It is shown that "the ultra-violet and infra-red portions of sunlight are stimulating to germination and enhance growth and development. The green portion of the solar spectrum, which is its region of maximal energy, is inhibitory to the processes of germination and growth. The development of chlorophyll is enhanced under the yellowish-green, green,

SHEARD, CHARLES, and others.—Continued.

and greenish-blue regions of the spectrum. The least development of chlorophyll occurs under the ultra-violet and infra-red portions of the spectrum."

SHIBATA, K.

(1860)

BEITRÄGE ZUR WACHSTUMSGESCHICHTE DER BAMBUSGEWÄCHSE. Jour. Col. Sci., Imp. Univ. Tokyo, 13: 427-496. 1900.

The author finds growth of the bamboo closely related to temperature and very little related to moisture.

SHIPPY, WILLIAM B.

(1861)

INFLUENCE OF ENVIRONMENT ON THE CALLUSING OF APPLE CUTTINGS AND GRAFTS. Amer. Jour. Bot. 17: 290-327. Apr., 1930.

A study of the influence of temperature, moisture, and aëration on the callusing of apple cuttings and grafts.

SHIRLEY, HARDY L.

(1862)

THE INFLUENCE OF LIGHT INTENSITY AND LIGHT QUALITY UPON THE GROWTH OF PLANTS. Amer. Jour. Bot. 16: 354-390. May, 1929.

In this study "an attempt has been made to discover what the light requirements for the survival of a few plants are, and how the rate of growth changes with increasing light intensities. A study of the effects of light quality upon growth has also been made, with particular emphasis upon the blue region of the spectrum as compared with the red."

SHIVE, JOHN W., and LIVINGSTON, BURTON E.

(1863)

THE RELATION OF ATMOSPHERIC EVAPORATING POWER TO SOIL MOISTURE CONTENT AT PERMANENT WILTING IN PLANTS. Plant World 17: 81-121. April, 1914.

SHOEMAKER, J. S.

(1864)

TEMPERATURE AND MOISTURE IN RELATION TO HARDINESS. Canad. Hort. 47: 4. Jan., 1924.

SHREVE, EDITH B.

(1865)

THE RÔLE OF TEMPERATURE IN THE DETERMINATION OF THE TRANSPIRING POWER OF LEAVES BY HYGROMETRIC PAPER. Plant World 22: 172-180. June, 1919.

(1866)

SEASONAL CHANGES IN THE WATER RELATIONS OF DESERT PLANTS. Ecology 4: 266-292. July, 1923.

The behavior of native desert species is noted when they are exposed to abundant moisture accompanied by relatively low temperatures, and when high temperatures are accompanied by scant moisture and low humidity.

SHREVE, FORREST.

(1867)

COLD AIR DRAINAGE. Plant World 15: 110-115. May, 1912.

This paper deals with inversions of temperature and their effect upon the distribution of vegetation near Tucson, Ariz.

(1868)

THE DENSITY OF STAND AND RATE OF GROWTH OF ARIZONA YELLOW PINE AS INFLUENCED BY CLIMATIC CONDITIONS. Jour. Forestry 15: 695-707. Oct., 1917.

The author discusses the relations of the Arizona yellow pine to environmental conditions, including those of climatic changes.

(1869)

THE INFLUENCE OF LOW TEMPERATURES ON THE DISTRIBUTION OF THE GIANT CACTUS. Plant World 14: 136-146. June, 1911.

The author finds that the greatest number of consecutive hours of freezing is the most important datum in determining the northward range of the giant cactus. "My observation of numerous species of desert plants which have been artificially irrigated or protected from extreme insolation shows that there is no one of them to which a slight amelioration of the atmospheric aridity, or a slight increase of the soil moisture, or of the number of times the soil is made wet, does not permit both a greater vegetative and a greater reproductive activity."

(1870)

RAINFALL AS A DETERMINANT OF SOIL MOISTURE. Plant World 17: 9-26. Jan., 1914.

"It is the purpose of the present paper to present a digest of a short record of desert rainfall, interpreted in terms of its possible effect upon soil moisture . . . The chief importance of rainfall to vegetation lies in its restoration of the supplies of soil moisture. In desert regions the rainfall consists largely of light, insignificant showers and heavy rains

SHREVE, FORREST—Continued.

with high run-off. In a study of desert rainfall in relation to the march of soil moisture it is necessary to determine the lower limit of amount of significant rainfalls. It is also necessary, in relation to vegetation, to ascertain the lengths of periods without significant rainfall."

(1871)

THE RÔLE OF WINTER TEMPERATURES IN DETERMINING THE DISTRIBUTION OF PLANTS. *Amer. Jour. Bot.* 1: 194-202. Apr., 1914.

Experimental work carried out in Arizona indicates "that the greatest number of consecutive hours of freezing temperature is the factor most closely corresponding, in its distribution, with the limitation of the species concerned."

(1872)

THE VEGETATION OF A DESERT MOUNTAIN RANGE AS CONDITIONED BY CLIMATIC FACTORS. 112 p. Washington, D. C., Carnegie institution, 1915.

"It is the purpose of the present paper to give a brief description of the vegetistic features of the various altitudes and topographic situations in the Santa Catalina Mountains, to give the results of the climatological instrumentation which has been carried on, and to indicate in so far as possible the manner and degree in which the successive altitudinal stages of vegetation are dependent upon the gradients of climatic change by which they are accompanied."

— and others.

(1873)

THE PLANT LIFE OF MARYLAND. *Md. Weather Serv. [Rpts.]* (n. s.), v. 3, 1910.

In part 1 the effect of temperature, humidity, rainfall, and wind on plant life is briefly discussed. p. 23-43.

SHULL, CHARLES A.

(1874)

SEMI-PERMEABILITY OF SEED COATS. *Bot. Gaz.* 56: 169-190. Sept., 1913.

The author discusses the permeability of certain seeds to water-soluble substances.

(1875)

TEMPERATURE AND RATE OF MOISTURE INTAKE IN SEEDS. *Bot. Gaz.* 69: 361-390. May, 1920.

"This paper deals with the quantitative influence of temperature on the velocity of moisture intake by certain seeds, chosen for the presence and absence of semipermeable coats." *Xanthium* seeds and commercial and garden peas were used for experimental purposes. "The paper considers critically the methods and interpretation of the similar work of Brown and Worley on *Hordeum* seeds."

— and SHULL, S. P.

(1876)

TEMPERATURE COEFFICIENT OF ABSORPTION IN SEEDS OF CORN. *Bot. Gaz.* 77: 262-279. May, 1924.

A study of the influence of wide temperature differences on the rate of water absorption by seeds of corn.

SHUTT, FRANK T.

(1877)

THE FERTILIZING VALUE OF SNOW. *Roy. Soc. Canada Proc. and Trans.* (3) 1 (Trans. Sect. 3): 35-38. 1907.

"With an average fall of 90 inches and with our present averages, we could state that the winter's snow furnished approximately, per acre, 1 pound of nitrogen valuable as a fertilizer."

(1878)

ON THE RELATION OF MOISTURE CONTENT TO HARDINESS IN APPLE TWIGS. *Roy. Soc. Canada Proc. and Trans.* (2) 9 (Sect. 4): 149-153. 1903.

"In the data furnished by this investigation extending over four months, it would seem that we have direct and definite proof that there is distinct relationship between the moisture content of the twig and its power to resist the action of frost, and that those trees whose new growth contains the largest percentage of water as winter approaches, are in all probability the most tender."

SIDERIS, C. P.

(1879)

INFLUENCE OF ENVIRONMENTAL FACTORS ON THE DEVELOPMENT OF PLANT DISEASES. *Parnassos [New York]* 1 (6): 26-28. 1926.

In Greek. Not examined.

Author's abstract in *Biol. Abs.* 1: 1020. Nov.-Dec., 1927.

"The author discusses the effects of environmental factors on normal and abnormal growth and development of plants in general. The fac-

SIDERIS, C. P.—Continued.

tors considered in detail are sunlight, temperature, moisture, physical and chemical properties of the soil, and parasitic organism . . . The treatise covers many phases of pathological conditions and attempts to explain the causes in each case."

SIERP, HERMANN.

(1880)

EIN BEITRAG ZUR KENNTNIS DES EINFLUSSES DES LICHTS AUF DAS WACHSTUM DER KOLEOPTILE VON AVENA SATIVA. Ztschr. Bot. 10: 640-729. 1918.

A study of the influence of light on the growth of the oat coleoptile.

(1881)

DIE ORIENTIERUNG DER BLÄTTER ZUM LICHT BEI PFLANZEN MIT GEKREUZTER BLATTSTELLUNG. Naturwissenschaften 5: 129-133. Mar. 2, 1917.

The movement of leaves towards the light is studied.

(1882)

ÜBER DEN EINFLUSS DES LICHTS AUF DAS WACHSTUM DER PFLANZEN. Ber. Deut. Bot. Gesell. 35 (Generalversammlungs-Heft 1): 8-20. 1917.

Experiments with the oat coleoptile show that light first furthers and then restricts growth while darkness first restricts and then furthers growth.

(1883)

UNTERSUCHUNGEN ÜBER DIE DURCH LICHT UND DUNKELHEIT HERVORGERUFENEN WACHSTUMSREAKTION BEI DER KOLEOPTILE VON AVENA SATIVA UND IHR ZUSAMMENHANG MIT DEN PHOTOTROPISCHEN KRÜMMUNGEN. Ztschr. Bot. 13: 113-172. 1921.

The influence of light and shade on the growth of the oat coleoptile is studied.

— and SEYBOLD, A.

(1884)

UNTERSUCHUNGEN ÜBER DIE LICHTEMPFLINDLICHKEIT DER SPITZE UND DES STUMPFES IN DER KOLEOPTILE VON AVENA SATIVA. Jahrb. Wiss. Bot. 65: 592-610. 1926.

The effect of light on the oat coleoptile is studied.

SILBERSCHMIDT, KARL.

(1885)

UNTERSUCHUNGEN ÜBER DIE ABHÄNGIGKEIT DES PFLANZLICHEN WACHSTUMS-VERLAUFES UND DER ERREICHTEN ENDLÄNGE VON KONSTANTEN TEMPERATUR-GRADEN. 95 p. Stuttgart, Schweizerbart, 1928. (Bibliotheca Botanica, Hft. 97.)

Effect of temperature on plant growth.

SILVESTER, N. L.

(1886)

NOTES ON THE BEHAVIOUR OF CERTAIN PLANTS IN RELATION TO THE WEATHER. Quart. Jour. Roy. Met. Soc. [London.] 52: 15-23. Jan., 1926.

The erratic movements of certain plants, including white clover, are studied in connection with their response to weather conditions.

SIMMONS, HERMAN G.

(1887)

VÄXTERNAS KÖLDBÖD OCH KÖLDRESISTENS. Landtmannen 12: 716-718. Aug. 17, 1929.

Cold resistance of plants is discussed.

SIMPSON, CHARLES T.

(1888)

EFFECTS ON VEGETATION OF THE HURRICANE IN FLORIDA. Plant World 6: 284-285. Dec., 1903.

SINZ, E.

(1889)

BEZIEHUNGEN ZWISCHEN TROCKENSUBSTANZ UND WINTERFESTIGKEIT BEI VERSCHIEDENEN WINTERWEIZENVARIETÄTEN. Jour. Landw. 62: 301-335. 1914.

Investigations carried out during the winters of 1911-12 and 1912-13 prove to the author that there is a direct connection between winter hardness in plants and their dry-matter content.

SIRIUSOV, M. G.

(1890)

INFLUENCE OF METEOROLOGICAL FACTORS ON THE DEVELOPMENT AND YIELD OF THE MILLETS PANICUM MILIACEUM AND SETARIA ITALICA IN RUSSIA. Work on Agr. Met. no. 16, p. 118-131. 1916.

In Russian. Not examined. Reference given as found.

Abstract in Internatl. Rev. Sci. and Pract. Agr. [Rome] 8: 342-346, Mar., 1917; and Expt. Sta. Rec. 38: 15-16, Jan., 1918.

"The present paper gives the results of a series of researches made by the author with the object of studying the specific action of meteorological factors upon the development of millet at the Agricultural Experiment Station of Temir, district of Turgai."

- SKARD, O. M. (1891)
OM SVINGNINGERNE I FRUGTUTBYTTET I NORGE. Tidsskr. Norske Landbr. 25: 305-332. Aug., 1918.
The author discusses the influence of rainfall on the fruit crop in Norway.
- SKIDMORE, C. L. (1892)
INDICATIONS OF EXISTING CORRELATION BETWEEN THE RAINFALL AND THE NUMBER OF CACAO PODS HARVESTED AT ABURI AND ASUANSI. Gold Coast Dept. Agr. Bul. 16, Year Book 1928: 114-120.
Not examined.
"The limiting effect of rainfall on the ensuing cacao crop has been illustrated by reference to the Belgian Congo, San Thomé and Ceylon. The absence of knowledge concerning effective rainfall and lesser limiting factors has been noted, and the necessity for narrower periods of harvesting has been pointed out. For Amelonado cacao at Aburi and Asuansi no correlation exists between the total annual rainfall inches and the total annual number of pods harvested. Evidence has been offered of a highly significant correlation existing at Aburi and Asuansi between the crop in any month with the rainfall five and six months previously." Author's abstract.
- SLY, F. G. (1893)
THE TRIAL OF EXOTIC DROUGHT-RESISTANT PLANTS IN INDIA. Agr. Jour. India 2: 161-170. 1907.
- SMALL, T. (1894)
TOMATO LEAF-MOULD. Nursery and Market Gard. Indus. Dev. Soc., Expt. and Research Sta., Turner's Hill, Cheshunt, Herts, England. Ann. Rpt. 13: 46-51. 1927.
Temperature and humidity relations to the disease are indicated.
"A SMALL TORNADO" AND TREE HAVOC IN STREET PARISH DURING THE RECENT DECEMBER AND JANUARY GALES. Quart. Jour. Roy. Met. Soc. [London] 56: 191-194. Apr., 1930. (1895)
- SMITH, ALBERT M. (1896)
ON THE APPLICATION OF THE THEORY OF LIMITING FACTORS TO MEASUREMENTS AND OBSERVATIONS OF GROWTH IN CEYLON. Ann. Roy. Bot. Gard. Peradeniya 3: 303-375. Nov., 1906.
"The object of the research was to test the applicability to facts of growth of the Theory of Limiting Factors outlined by F. F. Blackman in his paper on Optima and Limiting Factors. A general application of the theory to cases of growth from reserve material shows that the effective factors of the environment are (1) temperature, (2) water supply, (3) light, (4) atmospheric pressure, (5) velocity of wind."
(1897)
ON THE INTERNAL TEMPERATURE OF LEAVES IN TROPICAL INSOLATION, WITH SPECIAL REFERENCE TO THE EFFECT OF THEIR COLOUR ON THE TEMPERATURE; ALSO OBSERVATIONS ON THE PERIODICITY OF THE APPEARANCE OF YOUNG COLOURED LEAVES OF TREES GROWING IN PERADENIYA GARDENS. Ann. Roy. Bot. Gard. Peradeniya 4: 229-298. Mar., 1909.
(1898)
THE TEMPERATURE-COEFFICIENT OF PHOTOSYNTHESIS: A REPLY TO CRITICISM. Ann. Bot. [London] 33: 517-536. Oct., 1919.
An answer to three papers in the Philippine Journal of Science, which criticize adversely several current conceptions with regard to the rate of carbon assimilation in plants and the influence of the factors of temperature and light upon it.
- SMITH, BRADFORD B. (1899)
THE ADJUSTMENT OF AGRICULTURAL PRODUCTION TO DEMAND. Jour. Farm Econ. 8: 145-165. Apr., 1926.
The author suggests a "possible method of forecasting the yield of cotton per acre" by finding the relation between coldness in winter and boll-weevil damage in the following season. The results of a study of the relation between the temperatures from November 1 to the end of March from 1919-1924 and boll-weevil damage in the United States are outlined.

SMITH, BRADFORD B.—Continued. (1900)

FORECASTING THE VOLUME AND VALUE OF THE COTTON CROP. Jour. Amer. Statist. Assoc. (n. s.) 22: 442-459. Dec., 1927.

An analysis of the factors influencing cotton prices includes a brief account of the relation of weather to yield.

(1901)

RELATION BETWEEN WEATHER CONDITIONS AND YIELD OF COTTON IN LOUISIANA.

Jour. Agr. Research 30: 1083-1086. June 1, 1925.

The author establishes "a fairly close relationship between the weather conditions prior to September and the subsequent final yield of cotton."

SMITH, D. C., and BRESSMAN, E. N. (1902)

SOME EFFECTS OF SEED TREATMENT ON THE GERMINATION AND SUBSEQUENT GROWTH OF WHEAT. Jour. Agr. Research 40: 25-36. Jan. 1, 1930.

"Several causes have been assigned for the failure of winter wheat to mature normally when spring seeded . . . Exposure to freezing in the field, favorable light relations, and nutritional factors have been suggested as indispensable to normal growth." In the experiments described "germinating wheat grains survived 12 days of constant freezing at 12° C. . . . Alternate freezing and thawing was more detrimental to seedling growth than continuous freezing . . . Winter wheats showed an individual reaction to time of planting when subsequent growth was considered."

SMITH, J. HENDERSON. (1903)

THE KILLING OF BOTRYTIS CINEREA BY HEAT, WITH A NOTE ON THE DETERMINATION OF TEMPERATURE COEFFICIENTS. Ann. App. Biol. 10: 335-347. Dec., 1923.

The effect of moist heat on the spores of *Botrytis cinerea* (brown-rot fungus) is investigated. "It is pointed out that in the estimation of temperature coefficients comparison of the times taken to reach a constant result give more accurate and consistent values than comparison of the results reached in constant time."

SMITH, J. RUSSELL. (1904)

THE ECONOMIC GEOGRAPHY OF THE ARGENTINE REPUBLIC. Amer. Geogr. Soc. Bul. 35: 130-143. Apr., 1903.

The author discusses some of the weather conditions in the Argentine Republic in relation to its crops.

SMITH, J. WARREN. (1905)

AGRICULTURAL METEOROLOGY. Ohio Acad. Sci. Proc. 6 (pt. 5, Ann. Rpt.): 239-264. 1915.

In his address as president of the Ohio Academy of Science at its twenty-fifth meeting in 1915, the author discusses agricultural meteorology which "considers the effect of the weather conditions upon the development and yield of the different crops." Among the subjects dealt with are Weather and the yield of corn, The critical period for potatoes, and Weather and winter wheat. The value of such information imparted to the farmer is emphasized.

(1906)

AGRICULTURAL METEOROLOGY. Pan-Amer. Sci. Cong. 2, Washington, D. C. Proc. Sect. 2, 2: 75-90. 1915-16.

Author's résumé in U. S. Mo. Weather Rev. 44: 74-75. Feb., 1916.

Shows the correlation between temperature and rainfall and potatoes and winter wheat in Ohio and discusses the effect of snow covering on winter wheat.

(1907)

AGRICULTURAL METEOROLOGY. U. S. Mo. Weather Rev. 48: 281-282. May, 1920.

A very brief historical outline of some of the work done in different countries in connection with agricultural meteorology, and a brief account of three definite methods of determining the effect of weather conditions on the growth of crops.

(1908)

AGRICULTURAL METEOROLOGY; THE EFFECT OF WEATHER ON CROPS. 304 p. New York, The Macmillan Co., 1920.

The distinction between climate and weather is made. The bulk of the book is devoted to the elucidation of the work of various investigators in correlating the weather with various crops.

- SMITH, J. WARREN—Continued. (1909)
CLIMATIC FACTORS IN RELATION TO FARM MANAGEMENT PRACTICE. Amer. Farm Management Assoc. Proc. Ann. Meeting 1916: 63-79.
The relation of weather to cost of labor, crop risks, insect damage, and marketing is discussed. (1910)
-
- CORRELATION. U. S. Mo. Weather Rev. 39: 792-795. May, 1911.
Some of the simplest methods of correlation are explained, illustrated by the relation of the weather in June and July to the yield of potatoes in Ohio. (1911)
-
- DAMAGE TO CROPS BY WEATHER. U. S. Mo. Weather Rev. 48: 446. Aug., 1920.
A table gives the average damage to certain crops in the United States due to unfavorable weather conditions and other factors for the period from 1909 to 1919, and to apples and berries for 1912 to 1919.
"It will be noted that a very large part of the total damage or loss is due to unfavorable weather; also that deficient moisture is the greatest single damaging factor in connection with every crop, except apples. Low temperature causes nearly three times as much damage to apples as dry weather." This table, extended to include 1920 and 1921, may be found in Weather, Crops, and Markets 2: 277. Sept. 23, 1922. (1912)
-
- EFFECT OF SNOW ON WINTER WHEAT IN OHIO. U. S. Mo. Weather Rev. 47: 701-702. Oct., 1919.
A brief study of the part played by a snow cover on wheat in Ohio. (1913)
-
- THE EFFECT OF WEATHER UPON THE YIELD OF CORN. U. S. Mo. Weather Rev. 42: 78-87. Feb., 1914.
This paper contains a study of the correlation between rainfall and the yield of corn in the United States. It shows that the rainfall from mid-July to mid-August is of critical importance in determining the success or failure of the corn crop. Careful study of weather conditions up to August 10 makes possible a close estimate of the probable yield of corn. (1914)
-
- THE EFFECT OF WEATHER UPON THE YIELD OF POTATOES. Potato Mag. 1 (10): 11-14; (11): 15-17; (12): 7, 16-17, 27; 2 (1): 16-17, 33-34. 1919.
The author discusses the effect of weather upon the yield of potatoes and upon potato diseases. (1915)
-
- THE EFFECT OF WEATHER UPON THE YIELD OF POTATOES. U. S. Mo. Weather Rev. 43: 222-236. May, 1915.
The author discusses the effect of temperature and of rainfall on the yield of potatoes in Ohio. (1916)
-
- FROST WARNINGS AND ORCHARD HEATING IN OHIO. U. S. Mo. Weather Rev. 42: 573-583. Oct., 1914.
Contains an account of measures taken to prevent damage to fruit by frost in Ohio. (1917)
-
- INFLUENCE OF THE WEATHER ON THE YIELD OF CROPS. U. S. Mo. Weather Rev. 50: 567-572. Nov., 1922.
The author has determined a weather index of factors injurious to plant growth, and he discusses the correlation between that index and the yield of oats, corn, and cotton in certain parts of the United States. (1918)
-
- PREDICTING MINIMUM TEMPERATURES FOR FROST PROTECTION. Ohio Nat. 15: 405-408. Jan., 1915.
Rules are given. (1919)
-
- RELATION BETWEEN THE ANNUAL PRECIPITATION AND THE NUMBER OF HEAD OF STOCK GRAZED PER SQUARE MILE. U. S. Mo. Weather Rev. 48: 311-317. June, 1920.
"In the United States the stock capacity of pastures and ranges depends [largely] not only upon the annual precipitation but on its seasonal distribution, as well as on the evaporation, snow cover, and the length of the grazing period, the last three depending largely upon the temperature."

SMITH, J. WARREN—Continued.

(1920)

RELATION OF PRECIPITATION TO YIELD OF CORN. U. S. Dept. Agr. Yearbook 1903: 215-224. 1904.

A number of charts show the close relation between precipitation and yield of corn per acre in Ohio, Indiana, Illinois, Iowa, Nebraska, Kansas, Missouri, and Kentucky.

(1921)

SPEAKING OF THE WEATHER. U. S. Dept. Agr. Yearbook 1920: 181-202. 1921.

Reference is made to some of the effects of weather factors on crop development. "A full knowledge of the effect of the different weather factors on the development of crops, and especially of the most critical stage of development, and the factor having the greatest influence in varying the yield, would be of almost untold value to the farmers and other business men in this country."

(1922)

WINTER DAMAGE TO PEACHES. U. S. Mo. Weather Rev. 40: 29-30. Jan., 1912.

The author discusses briefly the damage done to peaches in Ohio by low temperatures.

and others.

(1923)

PREDICTING MINIMUM TEMPERATURES FROM HYGROMETRIC DATA. U. S. Mo. Weather Rev. Sup. 16. 76 p. 1920.

In a discussion by various authors of methods of predicting temperature references are made to the effect of temperature on cranberries, deciduous fruits, and alfalfa.

SMITH, RALPH E.

(1924)

WALNUT CULTURE IN CALIFORNIA. WALNUT BLIGHT. p. 119-398. Berkeley, 1912. (Calif. Agr. Expt. Sta. Bul. 231.)

Contains brief accounts of the effect of weather conditions on walnut trees and on walnut blight.

(1925)

THE WATER-RELATION OF PUCCINIA ASPARAGI. A CONTRIBUTION TO THE BIOLOGY OF A PARASITIC FUNGUS. Bot. Gaz. 38: 19-43. July, 1904.

It is shown that "dew is of absolute necessity in infection by the rust and of more importance than rain; that without moisture of this sort no infection can take place, regardless of all other conditions."

SMITH, RALPH W.

(1926)

THE TILLERING OF GRAIN AS RELATED TO YIELD AND RAINFALL. Jour. Amer. Soc. Agron. 17: 717-725. Nov., 1925.

"Comparing different years, mean tillering, mean yield, and rainfall from May 16 to July 15, all are closely correlated, showing the close relationships that exist between rainfall and tillering and between tillering and yield . . . In seasons of abundant rainfall tillering ability enabled the plants to respond to the moisture conditions and as a result to produce larger yields."

SMITH, WILLARD.

(1927)

WIND DAMAGE AND ITS PREVENTION. Calif. Citrogr. 9: 124, 144. Feb., 1924.

(1928)

WIND DAMAGES AS RELATED TO QUANTITY AND QUALITY PRODUCTION OF ORANGES. Calif. Citrogr. 10: 196, 206-207. Apr., 1925.

SMITS, DIRK DE VISSER.

(1929)

INVLOED DER TEMPERATUUR OP DE PERMEABILITEIT VAN HET PROTOPLASMA BIJ BETA VULGARIS L. 100 p. 'S-Gravenhage, G. C. T. van Dorp & Co., 1925. A study of the effect of temperature on the permeability of the protoplasm of the beet.

SMOLÁK, JAROSLAV.

(1930)

LETOŠNÍ MRAZOVÉ PORUCHY KOROVÝCH PLETIV. Ochrana Rostlin 9 (3-4): 49-54. Dec. 5, 1929. English summary on p. 54.

"The present paper describes different kinds of winter injury to the twigs and branches of the fruit trees in Mělník [Czechoslovak Republic] during the winter 1928-29."

SOLEREDER, H.

(1931)

UEBER FROSTBLASEN UND FROSTFLECKEN AN BLÄTTERN. Centbl. Bakt. [etc.] (2) 12: 253-262. June 24, 1904.

The author discusses the effect of frost on the leaves of apricot and peach trees.

SOMBART, WERNER.

(1932)

DIE STÖRUNGEN IM DEUTSCHEN WIRTSCHAFTSLEBEN WÄHREND DER JAHRE 1900
FF. Schr. Ver. Socialpolitik [Berlin] 113: 121-137. Sept., 1903.

He points out a dissimilarity in the rhythm of production of organic and inorganic commodities. The inorganic industries, as, for example, the steel trade, can expand for a time without being seriously hampered by scarcity of raw materials. The organic industries, as, for example, cotton-spinning, depend entirely upon the year's harvest, which, in turn, is dependent upon the weather. p. 130-133 (cf. Mitchell, Wesley C. Business Cycles, 1927, p. 16.)

SORAUER, PAUL.

(1933)

ALTES UND NEUES ÜBER DIE MECHANISCHEN FROSTBESCHÄDIGUNGEN. NACH-
TRÄGE V. Ztschr. Pflanzenkrank. 24: 65-76. Feb. 28, 1914.

Frost injury to grain is discussed.

(1934)

BLITZSPUREN UND FROSTSPUREN. Ber. Deut. Bot. Gesell. 25: 157-164. Apr.
23, 1907.

Frost damage to plants is briefly discussed.

(1935)

EXPERIMENTELLE STUDIEN ÜBER DIE MECHANISCHEN WIRKUNGEN DES FROSTES
BEI OBST- UND WALDBÄUMEN. Landw. Jahrb. 35: 469-526. 1906.

The effect of frost on fruit and forest trees is studied.

(1936)

FROSTBLASEN AN BLÄTTERN. Ztschr. Pflanzenkrank. 12: 44-47. May 12,
1902.

Contains an account of the effect of frost on the leaves of apple and cherry trees.

(1937)

DIE FROSTSCHÄDEN AN DEN WINTERSAATEN DES JAHRES 1901. Arb. Deut.
Landw. Gesell., Hft. 62, 204 p. 1901.

This is a study of frost damage based on observations made during the winter of 1900-1901.

(1938)

TUMOR UND APFELBÄUMEN. Ztschr. Pflanzenkrank. 21: 27-36. Mar. 8,
1911.

An apple tree disease is described, also its reaction to frost.

(1939)

ÜBER FROSTBESCHÄDIGUNGEN AM GETREIDE UND DAMIT IN VERBINDUNG STE-
HENDE PILZKRANKHEITEN. Landw. Jahrb. 32 (Hft. 1): 1-68. 1903.

The effect of frost on grain and grain disease is discussed.

(1940)

UNTERSUCHUNGEN ÜBER GUMMIFLUSS UND FROSTWIRKUNGEN BEI KIRSCHBÄU-
MEN. Landw. Jahrb. 39: 259-298. 1910; 41: 131-162. 1911; 42: 719-750.
1912; 46: 253-273. 1914.

Frost and the flow of cherry tree gum are studied.

SORDINA, COMTE.

(1941)

INFLUENCE DE LA SÉCHERESSE ET DU CHAMPIGNON ALTERNARIA SUR LA POMME
DE TERRE. Prog. Agr. et Vitic. 69: 131-134. Feb. 10, 1918.

The effect of drought on potatoes is briefly considered.

SOURSAC, LOUIS.

(1942)

LE ROUGEAU ET LA SÉCHERESSE. Prog. Agr. et Vitic. 82: 116-118. Aug. 3,
1924.

A brief account of the effect of drought on vines.

SPÄTH, HELLMUT L.

(1943)

DER JOHANNISTRIEB. EIN BEITRAG ZUR KENNTNIS DER PERIODIZITÄT UND
JAHRESEINGEBILDUNG SOMMERGRÜNER HOLZGEWÄCHSE. 91 p. Berlin, P.
Parey, 1912.

Experiments are made to test the effect of temperature, moisture, and shade on periodicity of woody plants.

SPAFFORD, RUSSELL R.

(1944)

THE EFFECT OF CLIMATE AND SOIL UPON AGRICULTURE. Nebr. Univ. Studies
16: 91-113. 1916.

Problems of temperature and rainfall and their effect on agriculture are discussed.

- SPAFFORD, W. J. (1945)
EFFECTS ON GERMINATION OF EXPOSING WHEAT DURING HEAT WAVES. Jour.
Dept. Agr. So. Aust. 33: 879-880, 882. May 15, 1930.
Experiments were made to test the resistance of harvested wheat to
high temperatures.
- SPALDING, VOLNEY M. (1946)
ABSORPTION OF ATMOSPHERIC MOISTURE BY DESERT SHRUBS. Bul. Torrey
Bot. Club 33: 367-375. July, 1906.
"A review of the data gathered establishes the fact that of the twelve
species of desert perennials subjected to experiment all exhibit some
slight capacity for direct absorption of water vapor from the atmosphere,
but in general the amount absorbed is inconsiderable in comparison
with that given off in corresponding periods in dry air."
- SPAULDING, PERLEY, and RATHBUN-GRAVATT, ANNIE. (1947)
CONDITIONS ANTECEDENT TO THE INFECTION OF WHITE PINES BY CRONARTIUM
RIBICOLA IN THE NORTHEASTERN UNITED STATES. Phytopathology 15: 573-
583. Oct., 1925.
"The factors which are necessary for the infection of white pines by
Cronartium ribicola are many . . . It is known that there must be a
period of sufficient moisture to germinate the teliospores, and that this
must be followed by a period of high humidity during which the infection
can take place. An attempt has been made to illustrate some of these
conditions graphically."
- SPEYER, WALTER. (1948)
DIE KLIMATISCHEN UND PARASITÄREN FAKTOREN IM URSACHENKOMPLEX DER
OBST-FEHLERNTEN AN DER NIEDERELBE. Arb. Biol. Reichsanst. Land u.
Forstw. 17: 423-434. Nov., 1929.
A discussion of the effect of temperature, rainfall, and sunlight on
the fruit trees of the Lower Elbe region for a number of years.
- SPILLMAN, W. J. (1949)
INFLUENCE OF AIR AND SUNSHINE ON THE GROWTH OF TREES. Science (n. s.)
63: 18. Jan. 1, 1926.
The author cites an example that came under his own observation
of the influence of air and sunshine and possibly moisture on the growth
of trees.
- SPOEHR, HERMAN A. (1950)
CHEMICAL EFFECTS OF RADIANT ENERGY IN PLANT PROCESSES. Carnegie Inst.
Wash., Dept. Bot. Research Rpt. 1911: 65; 1912: 63-65; 1913: 83-84.
(1951)
PHOTOSYNTHESIS. 393 p. New York, The Chemical Catalog Co. (Inc.), 1926.
Reviewed by E. N. Transeau in Ecology 8: 378. July, 1927.
In chapter 2, the effects of variations in light, temperature, chlorophyll,
water supply, etc., on plants are discussed.
- (1952)
PHOTOSYNTHESIS AND THE POSSIBLE USE OF SOLAR ENERGY. Jour. Indus. and
Engin. Chem. 14: 1142-1145. Dec., 1922.
"The purpose of the following brief outline is to show that, while
the photosynthetic process of the plant is at present the only means we
have of utilizing solar energy, this method is so very inefficient and sub-
ject to such great uncertainties that it is exceedingly doubtful whether it
can be depended upon to maintain our energy requirements."
- (1953)
THE THEORIES OF PHOTOSYNTHESIS IN THE LIGHT OF SOME NEW FACTS. Plant
World 19: 1-16. Jan., 1916.
- (1954)
VARIATIONS IN RESPIRATORY ACTIVITY IN RELATION TO SUNLIGHT. Bot. Gaz.
59: 366-386. May, 1915.
The experiments described were mostly made with wheat seedlings.
- SPRAGG, FRANK A. (1955)
WHEAT IMPROVEMENT. 15 p. East Lansing, 1912. (Mich. Agr. Expt. Sta.
Bul. 268.)
Gives data on the cold resistance of winter wheats in Michigan during
the winters of 1909-10 and 1911-12.
- SPRAGUE, MALCOLM. (1956)
FROSTS AND FROST PROTECTION IN TEXAS. U. S. Mo. Weather Rev. 42: 590.
Oct., 1914.

- STACCHINI, PAOLO. (1957)
IL GELO E L'ORTICOLTURA. Terra 5: 259-267. Apr., 1929.
The author discusses the damage done to garden plants by frost and outlines methods of combating it.
- STÄLFELT, M. G. (1958)
DIE ABHÄNGIGKEIT DER PHOTISCHEN SPALTÖFFNUNGSREAKTIONEN VON DER TEMPERATUR. Planta Arch. Wiss. Bot. 6: 183-191. Aug. 22, 1928.
A study of the effect of temperature on movements of stomata in leaves of *Vicia faba*.
- (1959)
DIE LICHTÖKONOMIE DER ARKTISCHEN PFLANZEN. Svensk Bot Tidskr. 19: 192-214. 1925.
The influence of Arctic sunlight on assimilation of carbonic acid.
- STAERK, EBERHARD. (1960)
STUDIEN ÜBER DEN NUTZWERT VON GRÄSERN UND KLEEARTEN UNTER DEM EINFLUSS VON KLIMA UND BODEN. Landw. Jahrb. 64: 817-930. 1926.
The effect of weather factors on grasses and clovers is studied.
- STAKMAN, E. C., and LAMBERT, E. B. (1961)
THE RELATION OF TEMPERATURE DURING THE GROWING SEASON IN THE SPRING WHEAT AREA OF THE UNITED STATES TO THE OCCURRENCE OF STEM RUST EPIDEMICS. Phytopathology 18: 369-374. Apr., 1928.
"From the data presented, it is evident that, in the past, there has been a tendency for destructive epidemics to develop in warm growing seasons, and for cool seasons to be comparatively free from rust. The amount of departure from normal also seems to have been correlated with the occurrence of epidemics."
- STAPLEDON, REGINALD G. (1962)
SEASONAL PRODUCTIVITY OF HERBAGE GRASSES . . . Welsh Plant Breeding Sta., Aberystwyth, [Bul.] ser. H., no. 3, p. 5-84. 1924.
The influence of meteorological conditions on the yield of hay is discussed. "The relation of the yield in the first harvest year to subsequent harvest years is influenced largely by the weather conditions in the first and second harvest years." Rainfall and sunshine are controlling factors in the yield.
- (1963)
SUBTERRANEAN CLOVER AND WINTER-KILLING. Jour. Min. Agr. [Gt. Brit.] 36: 616-619. Oct., 1929.
"The results under discussion have tended to indicate that winter-killing is in direct proportion to the degree of exposure of the situation and to the degree of heaviness of the autumn-winter early spring grazing."
- and DAVIES, WILLIAM. (1964)
WINTER "BURN" (OR "BROWNING") OF HERBAGE PLANTS. Jour. Min. Agr. [Gt. Brit.] 32: 1002-1015. Feb., 1926.
"Burn is accentuated by wet and water-logged conditions and by exposure."
- STAUBACHER. (1965)
DIE FROSTSCHÄDEN IM FORSTBETRIEB, DEREN URSACHEN UND BEKÄMPFUNG. Forstw. Centbl. 46: 1-13, 54-66, 98-111. 1924.
Frost injury in forests, its causes and prevention are studied.
- STEHLIK, V. (1966)
ÜBER HAGELSCHÄDEN AN ZUCHT-UND INDUSTRIERÜBEN. Ztschr. Zuckerindus. Čechoslovak. Repub. 53: 400-404. Mar., 29, 1929.
A study of damage done to beets by hail.
- STEINBAUER, GEORGE. (1967)
DIFFERENCES IN RESISTANCE TO LOW TEMPERATURES SHOWN BY CLOVER VARIETIES. Plant Physiol. 1: 281-286. July, 1926.
The result is given of tests made to determine the effect of low temperatures on germination of clover seeds before planting, on germination of seeds having imbibed various amounts of water, and on plants of different ages as well as the differences in resistance to low temperature shown by a number of varieties in the seedling and mature stages of growth.

- STEINMETZ, FERDINAND H. (1968)
WINTER HARDINESS IN ALFALFA VARIETIES. 33 p. University Farm, St. Paul,
June, 1926. (Minn. Agr. Expt. Sta. Tech. Bul. 38.)
A study is made of the relative winter hardiness of Grimm and of
common Kansas alfalfa.
- STEPHAN, JOHANNES. (1969)
BEITRAG ZUM PROBLEM DER LICHTSWIRKUNG. *Naturforscher* 5: 310-316. Oct.,
1928.
A contribution to the problem of the effect of light on plants.
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- UNTERSUCHUNGEN ÜBER DIE LICHTWIRKUNG BESTIMMTER SPEKTRALBEZIRKE
UND BEKANNTER STRAHLUNGSINTENSITÄTEN AUF DIE KEIMUNG UND DAS
WACHSTUM EINIGER FARNE UND MOOSE. *Planta. Arch. Wiss. Bot.* 5: 381-
443. Apr. 23, 1928.
An investigation of the effect of light on the germination and growth
of some ferns and mosses.
- STEVENS, NEIL E. (1971)
ENVIRONMENTAL TEMPERATURES OF FUNGI IN NATURE. *Amer. Jour. Bot.* 9:
385-390. July, 1922.
"The data presented in the present paper indicate that many plant
parts affected by fungi often show, when exposed to the sun, a tempera-
ture markedly above that of the air. They also indicate that the fungi
are sometimes subjected to fluctuations of temperature more rapid and
extreme than the fluctuations in the temperature of the air in the shade."
(1972)
-
- THE INFLUENCE OF CERTAIN CLIMATIC FACTORS ON THE DEVELOPMENT OF EN-
DOTHIA PARASITICA (MURR.) AND. *Amer. Jour. Bot.* 4: 1-32. Jan., 1917.
"The amount of growth [of chestnut blight] . . . is very closely related
to the duration and intensity of favorable temperatures . . . Dry
weather tends to reduce the spread of chestnut blight."
(1973)
-
- THE INFLUENCE OF TEMPERATURE ON THE GROWTH OF ENDOTHIA PARASITICA.
Amer. Jour. Bot. 4: 112-118. Feb., 1917.
"Neither amount nor frequency of rainfall seems to have any influ-
ence on rate of lateral growth . . . The agreement between the curves
of temperature and of growth is so close as to indicate that temperature
is the chief climatic influence in determining the rate of growth of
Endothia parasitica."
(1974)
-
- TEMPERATURES OF THE CRANBERRY REGIONS OF THE UNITED STATES IN RELATION
TO THE GROWTH OF CERTAIN FUNGI. *Jour. Agr. Research* 11: 521-529.
Dec. 3, 1917.
The author discusses the effect of rainfall and temperature on the
growth of the cranberry and its fungus parasites.
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- and HIGGINS, C. H. (1975)
TEMPERATURE IN RELATION TO QUALITY OF SWEETCORN. *Jour. Agr. Research*
17: 275-284. Sept. 15, 1919.
This paper shows that sweet corn deteriorates rapidly after it is
picked, and that the rate of deterioration depends upon the temperature.
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- and WILCOX, R. B. (1976)
TEMPERATURES OF SMALL FRUITS WHEN PICKED. *Plant World* 21: 176-183.
July, 1918.
It is shown that a number of small fruits have a temperature consider-
ably above that of the air on clear days, due to the absorption of radiant
energy from the sun.
- STEWART, BALFOUR. (1977)
SUSPECTED RELATIONS BETWEEN THE SUN AND THE EARTH. III. *Nature* [Lon-
don] 16: 45-47. May 17, 1877.
A table is given, drawn up by Dr. Arthur Schuster, in which he shows
that "the years of minimum sun spots coincide very nearly with the good
wine years in Germany."
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EIN KLEINER BEITRAG ZUR FRAGE ÜBER DEN EINFLUSS DES LICHTES AUF DIE
ENTWICKLUNG DER ZUCKERRÜBE. *Österr.-Ungar. Ztschr. Zuckerindus. u.*
Landw. 40: 849-856. 1911.

- STIFT, A.—Continued. (1979)
 EIN WEITERER KLEINER BEITRAG ZUR FRAGE ÜBER DEN EINFLUSS DES LICHTES AUF
 DIE ENTWICKLUNG DER ZUCKERRÜBE. Österr.-Ungar. Ztschr. Zuckerindus.
 u. Landw. 41: 939-943. 1912.
 The influence of light on the growth of the sugar beet is studied.
- STILES, WALTER. (1980)
 EVAPORATION IN WIND. A CRITICISM OF THE CONTRIBUTION OF H. SIERP AND
 K. L. NOACK TO THE PHYSICS OF TRANSPIRATION. Ann. Bot. [London] 38:
 299-304. Apr., 1924.
- INFLUENCE OF ENVIRONMENTAL FACTORS ON GROWTH AND DEVELOPMENT OF
 PLANTS. Sci. Prog. in the Twentieth Century [London] 14: 392-396. Jan..
 1920.
 Contains references to recent researches on the subject.
- ON THE CAUSE OF COLD DEATH OF PLANTS. Protoplasma 9: 459-468. Apr., 1930. (1982)
- PHOTOSYNTHESIS; THE ASSIMILATION OF CARBON BY GREEN PLANTS. 268 p. (1983)
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 STUDIES IN PERMEABILITY. V. THE SWELLING OF PLANT TISSUE IN WATER AND
 ITS RELATION TO TEMPERATURE AND VARIOUS DISSOLVED SUBSTANCES. Ann.
 Bot. [London] 31: 415-434. July-Oct., 1917.
 The swelling of potato and carrot in water and the influence of
 temperature thereon are investigated, and the bearing of the facts
 described on some theories of permeability is discussed.
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 CLIMATE OF THE COTTON BELT. U. S. Mo. Weather Rev. 47: 487-489. 1919.
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 (cotton). See under United States.
 Weather conditions favorable for cotton are briefly discussed.
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 PRAKTISCHE ERFAHRUNGEN MIT DEN EINFLÜSSEN DES KÜSTENWINDES AUF DIE
 KULTURPFLANZEN. Illus. Landw. Ztg. 49: 202-203. 1929.
 Not seen.
 The influence of wind on cultivated plants.
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 A COMPARATIVE STUDY OF WINTER AND SUMMER LEAVES OF VARIOUS PLANTS.
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 FROST CRACKS. p. 110-114. Amherst, 1912. (Mass. Agr. Expt. Sta. Ann.
 Rpt. 24, pt. 1.)
- INJURY TO VEGETATION RESULTING FROM CLIMATIC CONDITIONS. Jour. N. Y.
 Bot. Gard. 17: 173-179. Oct., 1916. (1989)
 The author discusses some of the weather conditions which underlie
 winterkilling.
- SUN SCORCH OF THE PINE. p. 65-69. Amherst, 1910. (Mass. Agr. Expt.
 Sta. Ann. Rpt. 22, pt. 2, Jan., 1910.) (1990)
- WINTERKILLING. p. 119-124. Amherst, 1906. (Mass. Hatch Expt. Sta.
 Ann Rpt. 18.) (1991)
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 Ber. West Preuss. Bot.-Zool. Ver. 48: 81-84. 1926.
 A very brief discussion of the effect of light and temperature on the
 rest period of leaves of trees. It seems to be most influenced by
 atmospheric electricity.
- STOPPEL, ROSE. (1993)
 BEITRAG ZUM PROBLEM DER PERZEPTION VON LICHT UND SCHWEREREIZ DURCH DIE
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 The reaction of barley seedlings to light is studied.

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DIE BEZIEHUNG TAGESPERIODISCHER ERSCHEINUNGEN BEIM TIER UND BEI DER
PFLANZE ZU DEN TAGESPERIODISCHEN INTENSITÄTSSCHWANKUNGEN DER ELEK-
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SEVERE HAIL INJURY TO TREES AND SHRUBS. *Science (n. s.)* 71: 187-188.
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CLIMATIC INFLUENCE ON VINEYARDS. *Quart. Jour. Roy. Met. Soc. [London]*
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only to the importation of foreign wines, but also to climatic changes.
- STRAKOSCH, SIEGFRIED. (1998)
ÜBER DEN EINFLUSS DES SONNEN-UND DES DIFFUSEN TAGESLICHTES AUF DIE
ENTWICKLUNG VON BETA VULGARIS (ZUCKERRÜBE). *Österr.-Ungar. Ztschr.*
Zuckerindus. u. Landw. 35: 1-11. 1906.
Although sunlight stimulates the formation of starch in the sugar beet,
it can form all the starch required for normal development in diffused
light.
- STRAŇÁK, FRANTISEK. (1999)
FUSARIOSA ŽITA. *Ochrana Rostlin* 1 (1-2): 5-7. May, 1921.
Abstract in *Bot. Abs.* 12: 96. Jan., 1923.
Snow mold of cereals.
- (2000)
O PŘEZIMOVÁNÍ ŠKÁDCŮ KULTURNÍCH ROSTLIN. *Ochrana Rostlin* 7: 113-118.
Dec., 1927.
Winter injury to cultivated plants.
- STRAUGHN, M. N., and CHURCH, C. G. (2001)
THE INFLUENCE OF ENVIRONMENT ON THE COMPOSITION OF SWEET CORN. 1905-
1908. 69 p. Washington, D. C., 1909. (U. S. Dept. Agr., Bur. Chem.
Bul. 127.)
"The factors which are most effective in influencing the quality of the
crop are length of day, with its concomitants, the amount and distribution
of sunshine, the altitude, the temperature, and the amount and distribu-
tion of rainfall." Of these "it appears that the amount and distribution
of rainfall are the most important. A moderate and well-distributed
rainfall, especially during the growing season, is necessary to produce
a crop having the best qualities. Excessive rainfall in the latter part of
the growing season or a great deficiency during the germinating and
growing period equally interferes with the excellence of the crop."
- STRAUSBAUGH, P. D. (2002)
DORMANCY AND HARDINESS IN THE PLUM. *Bot. Gaz.* 71: 337-357. May, 1921.
"During the period of dormancy the moisture content of the semi-
hardy varieties fluctuates with the temperature. Periods of low tem-
peratures are accompanied by a loss of moisture from the leaf and fruit
buds, and higher winter temperatures, which are seldom above freezing
in Minnesota, by an increase in moisture content."
- STROHMER, F. (2003)
EINFLUSS DER BELICHTUNG AUF DAS WACHSTUM DER SAMENRÜBEN. *Österr.-*
Ungar. Ztschr. Zuckerindus. u. Landw. 41: 913-931. 1912.
It is shown that limitation of light has an unfavorable effect on the
development of seed beets. But when the latter reach maturity it is
found that the yield and sugar content remain uninfluenced.
- STRONG, FORREST C. (2004)
FUNGUS DISEASES ATTACK TREES IN WET SEASONS. 17 p. East Lansing,
1928. (*Mich. Agr. Expt. Sta. Quart. Bul.* v. 11, Aug., 1928.)
Several leaf disease fungi and their prevalence in wet weather are
discussed. "In practically no case is there need to fear for the life of
trees attacked by the common leaf inhabiting fungi."

- STRUVE, W. (2005)
FRÜHLINGSFESTIGKEIT DER WIESENGRÄSER UND KLEEARTEN. A. Pflanzenzüchtung, Ztschr. Pflanzenzücht. 15: 9-16. Jan., 1930.
Spring hardiness of meadow grasses and clovers is discussed.
- STUART, WILLIAM. (2006)
ON THE WINTER INJURY OF APPLE TREES. p. 299-300. Burlington, 1905.
(Vt. Agr. Expt. Sta. Ann. Rpt. 18, 1904-05.)
- SUESSGUTH, KARL. (2007)
UEBER DIE BLÜTEPERIODEN DER BAMBUSEN. Flora 118-119: 503-535. 1925.
(Goebel-Festschrift.)
The influence of weather factors on the blooming period of the bamboo in different parts of the world is discussed.
- SUNLIGHT AND FUNGI. Agr. Soc. Trinidad and Tobago, Proc. 10: 45-54. 1910.
Soc. Paper 404.) (2008)
A discussion of the effect of sunlight on fungi provoked by a paper on the witch-broom disease by Dr. C. J. J. van Hall. For Doctor van Hall's views, see under his name.
- SUTTON, G. L. (2009)
THE ABSORPTION OF MOISTURE BY WHEAT GRAIN AND ITS RELATION TO THE HUMIDITY OF THE ATMOSPHERE. Roy. Soc. West. Aust. Jour. and Proc. 6 (pt. 2): 74-87. 1919-20.
It is shown that there is a correlation between the moisture content of wheat after harvest and the relative humidity of the air.
- SWINGLE, WALTER T. (2010)
DATE GROWING: A NEW INDUSTRY FOR SOUTHWEST STATES. U. S. Dept. Agr. Yearbook, 1926: 302-306. 1927.
"The climatic hazards of the date are much less than of oranges, lemons, and other citrus fruits. Young date palms are injured by severe cold weather in winter, but after the palms are well established they can stand temperatures as low as 15° F. without serious injury beyond the freezing of a few leaves. Dates are much injured by rain and many varieties are badly injured even by dew or excessive humidity during the ripening season. In general, rains and moist weather are the chief climatic hazards of the date grower."
- (2011)
THE DATE PALM AND ITS CULTURE. U. S. Dept. Agr. Yearbook, 1900: 453-490. 1901.
"The date palm . . . requires a long, extremely hot and dry summer in order to mature its fruits properly, yet the roots demand a constant supply of water. It is unable to endure severe cold in winter, although more hardy than the orange tree."
- (2012)
THE DATE PALM AND ITS UTILIZATION IN THE SOUTHWESTERN STATES. 155 p. Washington, D. C., 1904. (U. S. Dept. Agr., Bur. Plant Indus. Bul. 53.)
"The date palm can endure any degree of heat and any amount of dryness in the air and is even favored by hot winds and by a rainless summer."
- SYLVÉN, NILS. (2013)
1917 ÅRS KNÄCKESJUKA I NORRA VÄSTERGÖTLAND. Meddel. Statens Skogs-försöksanst. [Sweden] 15: 192-204. 1918.
The effect of dry weather on the development of the pine branch twist fungus is discussed.
- SZEGLOFF, O. (2014)
SUR L'ADAPTATION DES PLANTES À LA DURÉE DE LA PÉRIODE CLAIRE DE LA JOURNÉE. Nauch. Inst. Imeni P. F. Lesgafta. [Leningrad] (Bul. Inst. Sci. Lesshaft) 9 (1): 80-98. 1924.
In Russian, with French summary.
A study of the adaptation of green plants to daylight.
- TALANOFF, V. (2015)
RELATION BETWEEN RAINFALL AND THE MAIZE CROP IN RUSSIA. Internatl. Inst. Agr., Bur. Agr. Intell. and Plant Diseases Bul. Year 3: 1264-1266. June. 1912.
Abstract of a Russian article, published in the Agr. Rev. South Russia No. 10, p. 11-13. Kharkov, Apr., 1912. It contains a table showing the effect of rainfall on different varieties of maize.

- TALMAN, CHARLES F. (2016)
NATURE'S OWN WEATHER BUREAU. A GLANCE AT THE LITTLE KNOWN SCIENCE OF PHENOLOGY. *Nature Mag.* 12: 325-328. Nov., 1928.
Reprinted in *Tycos* 19: 125-128. Oct., 1929.
The author points out the importance to the farmer of the science of phenology which is a study of the recurrent phenomena of life and of their relations to weather and climate.
- TAMMES, TINE. (2017)
ÜBER DEN EINFLUSS DER SONNENSTRAHLEN AUF DIE KEIMUNGSFÄHIGKEIT VON SAMEN. *Landw. Jahrb.* 29: 467-482. 1900.
The author describes experiments which prove to him that sunlight has neither a favorable nor a harmful effect on the germination of dry seeds.
- TAPKE, VICTOR F. (2018)
THE RÔLE OF HUMIDITY IN THE LIFE CYCLE, DISTRIBUTION, AND CONTROL OF THE LOOSE SMUT FUNGUS OF WHEAT. (Abstract) *Phytopathology* 19: 103. Jan., 1929.
Abstract of a paper presented at the twentieth annual meeting of the American Phytopathological Society, New York, N. Y., Dec. 28, 1928-Jan. 1, 1929.
- TAUBENHAUS, J. J., and DANA, B. F. (2019)
THE INFLUENCE OF TEMPERATURE AND SOIL MOISTURE ON COTTON ROOT ROT. 23 p. College Station, 1928. (*Tex. Agr. Expt. Sta. Bul.* 386.)
"Three climatic factors, rainfall, air humidity, and temperature, have been studied to determine the influence of each on the root-rot disease."
- TAVCAR, ALOIS. (2020)
WINTERFESTIGKEIT UND GENETISCH BEDINGTE TIEFLAGE DER VEGETATIONSPUNKTE AN GETREIDEPLANZEN. *A. Pflanzenzüchtung. Ztschr. Pflanzenzücht.* 15: 63-74. Feb., 1930.
It is shown that the depth of the vegetation point has an important influence on winter hardiness of grain.
- TAYLOR, C. SOMERS. (2021)
CLIMATE AS A FACTOR IN THE RICHNESS OF SUGARCANE JUICE. *Agr. Jour. India* 7 (pt. 1): 23-40. Jan., 1912.
The author discusses the adaptability of various kinds of sugarcane to different climates, because of the effect on it of temperature and rainfall.
"In choosing suitable canes for countries outside the tropics, the difficulty of the choice is enhanced by the demand that the canes . . . come to a maximum sugar content varying, from year to year, within a very narrow period, the length of which varies very little."
- TAYLOR, GRIFFITH. (2022)
AGRICULTURAL CLIMATOLOGY OF AUSTRALIA. *Quart. Jour. Roy. Met. Soc. [London]* 46: 331-356. Oct., 1920.
The author discusses the influence of rainfall on the crops and on the sheep-raising industry of Australia.
- THE AUSTRALIAN ENVIRONMENT (ESPECIALLY AS CONTROLLED BY RAINFALL). 188 p. Melbourne, H. J. Green, acting government printer, 1918. (*Aust. Advisory Council Sci. and Indus. Mem.* 1.) (2023)
The author aims at giving as complete an account of Australian rainfall and its controlling influence upon vegetation as is possible with the data available.
- THE CLIMATIC CONTROL OF AUSTRALIAN PRODUCTION. 32 p. [Melbourne], A. J. Mullett, [1916?]. (*Aust. Commonwealth Bur. Met. Bul.* 11.) (2024)
The relation of wheat growing to temperature and rainfall is discussed.
- TAYLOR, NORMAN. (2025)
EFFECT OF THE PAST WINTER ON SHRUBS AND TREES IN THE GARDEN. *Brooklyn Bot. Gard. Rec.* 1: 72-74. July, 1912.
- EFFECTS OF THE SEVERE WINTER ON THE WOODY PLANTS IN THE GARDEN. *Brooklyn Bot. Gard. Rec.* 7: 83-87. July, 1918. (2026)
- EFFECTS OF THE WINTER OF 1919-1920 ON THE WOODY PLANTS IN THE GARDEN. *Brooklyn Bot. Gard. Rec.* 9: 121-123. Oct., 1920. (2027)

- TAYLOR, NORMAN—Continued. (2028)
 WHAT THE WINTER OF 1916 DID TO THE GARDEN EVERGREEN COLLECTIONS.
 Brooklyn Bot. Gard. Rec. 5: 140-142. Oct., 1916.
- WHY THIS HIGH DEATH RATE IN PLANTS? THE SUN, THE WIND, AND THE GARDENER. Gard. and Home Builder 42: 426. Feb., 1926. (2029)
- [TEA]. OBSERVATIONS DURING DROUGHT. Quart. Jour. Indian Tea Assoc. Sci. Dept. pt. 2, p. 47-52. 1919. Reprinted in Trop. Agr. 53: 305-308. Nov., 1919. (2030)
 This article, signed H. R. C., discusses the effect of drought on pruned and unpruned tea.
- TEDOROV, D. B. (2031)
 THE EFFECT OF DAMP AND FROST UPON WINTER CEREALS. Internatl. Inst. Agr., Bur. of Agr. Intell. and Plant Diseases Bul. Year 2: 1265-1266. June, 1911.
 Abstract of a Russian article on the effect of late white frosts on rye and wheat.
- TEHON, LEO R. (2032)
 EPIDEMIC DISEASES OF GRAIN CROPS IN ILLINOIS, 1922-1926. THE MEASUREMENT OF THEIR PREVALENCE AND DESTRUCTIVENESS AND AN INTERPRETATION OF WEATHER RELATIONS BASED ON WHEAT LEAF RUST DATA. Ill. Nat. Hist. Survey Bul. v. 17, art. 1. 96 p. 1927.
 A study is made of the relation of temperature and rainfall to leaf rust of wheat. It is shown that "there is a well-defined relation between intensity of attack and annual mean temperatures, and yearly totals of rainfall; that in the July-December period of the year temperature has a greater influence than rainfall, while in the January-June period rain is the more important, in determining the destructiveness of a year's rust attack; that there is a possibility of predicting with reasonable accuracy the date upon which the first spring infection will occur in any part of the State in any year; that during the months of May and June the correlation between disease development and weather conditions lies mainly with temperature; and that the degree of destructiveness which an epidemic, once started, is likely to attain may be predicted from the rapidity with which degrees of mean daily temperature accumulate." (2033)
- THE FIELD SURVEY AS A BASIS FOR THE PHENOLOGICAL INTERPRETATION OF THE PLANT DISEASE EPIDEMIC. (Abstract) Phytopathology 16: 63. Jan., 1926.
 Abstract of a paper presented at the seventeenth annual meeting of the American Phytopathological Society, Kansas City, Mo., Dec. 29-31, 1925.
 "From quantitative records accumulated by the State Natural History Survey in its plant disease survey of Illinois, those of three selected diseases—potato late-blight, wheat leaf-rust, and apple bitter-rot, are briefly tabulated and the prevalence and intensity of each correlated with temperature and rainfall by means of climographs." (2034)
- and YOUNG, P. A. (2034)
 NOTES ON THE CLIMATIC CONDITIONS INFLUENCING THE 1923 EPIDEMIC OF STEM RUST ON WHEAT OF ILLINOIS. Phytopathology 14: 94-100. Feb., 1924.
 "Pertinent observations are presented here in connection with climatological data for the purpose of pointing out the influence of temperature and moisture in the development of an epidemic extending over a wide area."
- TEMPERATURE RELATIONS OF CROP PLANTS. Kans. Agr. Expt. Sta. Rpt. 1926-28: 34-36. (2035)
 Some results are given of studies made "to determine the relation between the resistance of winter annuals to low temperature and the resistance to winterkilling . . . to determine the relation of winter hardness to hardening off; and the effect of chilling (temperatures slightly above zero) on certain summer plants."
- TEMPLETON, JAMES. (2036)
 THE EFFECT OF LATE FROST ON THE WOOD OF ACER PSEUDOPLATANUS, LINN. Notes Roy. Bot. Gard. Edinb. 14: 9-12. Jan., 1923.
- TENGWALL, T. A., and VAN DER ZYL, C. E. (2037)
 HET VERBAND TUSSCHEN KLIMAAT EN SUIKERPRODUCT OP JAVA. Arch. Suiker-indus. Nederland. Indië jaarg. 32, deel 3. 1924. Meded. 4: 65-139. 1924.
 The correlation method is used to show an important relation between seasonal rainfall and sugar yield in Java.

- TENNENT, R. B. (2038)
THE RELATION OF METEOROLOGY TO AGRICULTURE. New Zealand Jour. Agr. 33: 381-386. Dec. 20, 1926.
- TEODORESCO, EMANUEL C. (2039)
LA VOLUBILITÉ À L'OBSCURITÉ. Rev. Gén. Bot. 37: 212-232, 261-278, 303-320, 360-368. 1925.
The effect of darkness on twining plants is studied.
- THATCHER, R. W. (2040)
THE RELATION OF PROTEIN CONTENT OF WHEAT TO RAINFALL. Amer. Soc. Agron. Proc. 3: 42-45. 1911.
A study of the wheat belt of Washington indicates that "under conditions of uniform soil, growing season, distribution of annual rainfall, elevation, etc., with the total annual rainfall the only variable, the average protein content of wheat varies inversely with the total rainfall received."
- THAYER, PAUL. (2041)
WINTERKILLING OF PEACH BUDS. p. 311-312. Wooster, 1916. Ohio Agr. Expt. Sta. Mo. Bul. v. 1, no. 10.
A table shows varietal differences in winterkilling of peach buds.
- THEISS, LEWIS E. (2042)
WHY PLANTS BLOSSOM AND BEAR FRUIT. THE NEED FOR DARKNESS AS WELL AS LIGHT. HOW THE BLOOMING OF PLANTS MAY BE ADVANCED OR RETARDED BY THE LENGTH OF TIME TO WHICH THEY ARE EXPOSED TO THE LIGHT. HOW LESS LIGHT MAKES SOME BLOOM EARLIER. World's Work 46: 316-323. July, 1923.
- THIESSEN, ALFRED H. (2043)
ORCHARD HEATING. U. S. Mo. Weather Rev. 39: 761-762. May, 1911.
Discusses methods of frost fighting in Colorado. (2044)
- PROTECTION FROM FROST IN UTAH. U. S. Mo. Weather Rev. 42: 586-587. Oct., 1914.
The author refers briefly to the two seasons in Utah when agricultural products are subject to frost.
- THIRY, L. (2045)
L'EAU ET L'AGRICULTURE. Rev. Gén. Agron. 14: 161-164, 198-206, 258-265. 296-307. 1905.
The part played by water in the life of the plant is discussed as well as means to prevent injury from drought.
- THODAY, DAVID. (2046)
ON THE BEHAVIOUR DURING DROUGHT OF LEAVES OF TWO CAPE SPECIES OF PASSERINA, WITH SOME NOTES ON THEIR ANATOMY. Ann. Bot. [London] 35: 585-601. Oct., 1921.
- THOMAS, HARVEY E. (2047)
ROOT AND CROWN INJURY OF APPLE TREES. 9 p. Ithaca, N. Y., 1926. (N. Y. Cornell Agr. Expt. Sta. Bul. 448.)
"The writer is led to the conclusion that the greater part of the crown and root injury of apple trees in [New York] State is initiated by low temperatures."
- THOMAS, M. T. (2048)
THE INFLUENCE OF DATE OF SOWING ON THE PERMANENCY OF CERTAIN LEGUMES AS CONSTITUENTS OF PASTURES. Welsh Jour. Agr. 6: 175-182. Jan., 1930.
"The effect of sowing date on yield and establishment in the seeding and first harvest years has been discussed in the case of yellow suckling clover, subterranean clover, and the perennial birdsfoot trefoils. The range of sowing dates for successful overwintering for the legumes under test is very limited."
- THOMPSON, H. C. (2049)
FACTORS INFLUENCING EARLY DEVELOPMENT OF SEED STALK OF CELERY. Amer. Soc. Hort. Sci. Proc. 1923: 219-224.
The effect of low temperature and of light on seed-stalk development of celery is discussed.
- THOMPSTONE, E. (2050)
THE GINNING PERCENTAGE OF COTTON IN ITS RELATION TO THE SEASON. Agr. Jour. of India 15: 568-570. Sept., 1920.
Tables are given which seem to show that the ginning percentages and the yield of cotton dropped about 3 per cent during the unfavorable season of 1918-19 in Burma.

THORNBEE, J. J. (2051)

THE GRAZING RANGES OF ARIZONA. p. 245-360. Tucson, 1910. (Ariz. Agr. Expt. Sta. Bul. 65.)

In chapter 2 there is an account of the relation of the growth of forage plants in Arizona to rainfall and temperature.

(2052)

RELATION OF PLANT GROWTH AND VEGETATION FORMS TO CLIMATIC CONDITIONS. Plant World 12: 1-7. Jan., 1909.

Contains a brief account of the relation of plant growth to climatic conditions in different parts of Arizona.

TIEDJENS, V. A. (2053)

SEX RATIOS IN CUCUMBER FLOWERS AS AFFECTED BY DIFFERENT CONDITIONS OF SOIL AND LIGHT. Jour. Agr. Research 36: 721-746. Apr. 15, 1928.

"An abundance of light tends to increase the number of staminate flowers within certain limits. The reduction of light materially increases the number of pistillate flowers and decreases the number of staminate flowers."

TINCKER, MAURICE A. H. (2054)

EFFECT OF LENGTH OF DAILY PERIOD OF ILLUMINATION UPON THE GROWTH OF PLANTS. Jour. Roy. Hort. Soc. 54: 354-378. Sept., 1929.

"Flowering was delayed by short periods of light in the case of mangels, whilst sugar beet ripened its fruit more slowly under a period of 10 hours light per day. The varieties of swede tested did not show any striking difference between the 10-hour and control series. It was found that the habit of growth of a number of species when grown under a daily period of 12 hours daylight, prolonged by 5 hours electric light of weak intensity . . . resembled that of plants receiving the full natural daylight (some 16 hours a day) far more closely than that of plants receiving 12 hours daylight a day. This was observed with both short-day and long-day plants. Other species tested indicated that light of weak intensity can modify the rate of tuber production, and the utilization of the food products."

(2055)

EFFECT OF LENGTH OF DAY ON FLOWERING AND GROWTH. Nature [London] 114: 350-351. Sept. 6, 1924.

(2056)

THE EFFECT OF LENGTH OF DAY UPON THE GROWTH AND CHEMICAL COMPOSITION OF THE TISSUES OF CERTAIN ECONOMIC PLANTS. Ann. Bot. [London] 42: 101-140. Jan., 1928.

"The response to curtailed periods of daylight shown by several species of economic importance which had not been previously tested is here described."

(2057)

THE EFFECT OF LENGTH OF DAY UPON THE GROWTH AND REPRODUCTION OF SOME ECONOMIC PLANTS. Ann Bot. [London] 39: 721-754. Oct., 1925.

"The behaviour of a number of plants under short periods of natural illumination has been studied. Particular attention has been paid to herbage plants . . . Economic possibilities arising out of a consideration of the results are briefly touched upon . . . Evidence has been presented to show the controlling influence of environment on internal chemical composition, plant form, behaviour, and periodicity."

TIPPETT, L. H. C. (2058)

ON THE EFFECT OF SUNSHINE ON WHEAT YIELD AT ROTHAMSTED. Jour. Agr. Sci. [England] 16: 159-165. Apr., 1926.

"When it is remembered that the standard deviation of the sunshine constants (measured in hours) is about thirty times the standard deviation of the rainfall constants (measured in inches) it will be seen that on the whole, sunshine and rainfall are quite comparable in their effect on the wheat yield."

TODARO, F., CRESCINI, F., and TETTAMANZI, A. (2059)

SULLA RESISTENZA DEL GRANO ALLE BASSE TEMPERATURE. Ital. Agr. 66: 546-552. July, 1929.

The effect of low temperatures on grain is discussed.

and MOSNEAGA, W. (2060)

II MAIS IN RELAZIONE ALLA SICCITÀ. Ital. Agr. 66: 1-5. Jan., 1929.

The effect of dry weather on maize (corn) is discussed.

- TOLLENAAR, D. (2061)
 DARK GROWTH RESPONSES. K. Akad. Wetensch., Amsterdam. Proc. Sect. Sci. 26: 378-389. 1923.
 Light and dark growth responses of the oat coleoptile and sinapis alba.
 — and BLAAUW, A. H. (2062)
 LIGHT AND DARK ADAPTATION OF A PLANT CELL. K. Akad. Wetensch., Amsterdam. Proc. Sect. Sci. 24: 17-32. 1922.
- TOLMACHOV, I., and PAVLOVSKII. (2063)
 EFFECT OF DARKNESS AND OF LIGHT ON THE ORGANIC ACIDS IN THE PLANT. Kief Sil'skogospodarskii Inst. (Mem. Agr. Inst. Kyiv) 2: 11-21. 1927.
 In Russian, with English abstract.
 Not seen. Abstract in Expt. Sta. Rec. 63: 123. Aug., 1930.
 Results are given of experiments made with a number of plants, including sugar beets, tobacco, and lupine.
- TOMPKINS, R. G. (2064)
 THE WATER RELATIONSHIPS OF FRUIT-ROTTING FUNGI. [Gt. Brit.] Dept. Sci. and Indus. Research, Food Invest. Bd. Rpt. 1927: 36-38.
 The effect of temperature and humidity on the growth of fruit-rotting fungi is shown by means of an experiment.
- TOMPKINS, C. M. (2065)
 EFFECT OF INTERMITTENT TEMPERATURES ON POTATO MOSAIC. (Abstract) Phytopathology 15: 46. Jan., 1925.
 Abstract of a paper presented at the sixteenth annual meeting of the American Phytopathological Society, Washington, D. C., Dec. 30, 1924-Jan. 1, 1925.
- TOTTINGHAM, WILLIAM E. (2066)
 TEMPERATURE EFFECTS IN PLANT METABOLISM. Jour. Agr. Research 25: 13-30. July 7, 1923.
 Experiments are described showing the effect of atmospheric temperature and humidity upon the chemical composition of plants.
- (2067)
 TEMPERATURE EFFECTS IN THE METABOLISM OF WHEAT. Plant Physiol. 1: 307-336. Oct., 1926.
 Details are given of experiments made with nine series of wheat cultures, each of which was subjected to two planes of temperature, with illumination and atmospheric humidity uniform.
- and KERR, H. W. (2068)
 CLIMATIC EFFECTS IN THE METABOLISM OF MAIZE. Plant Physiol. 1: 415-416. Oct., 1926.
 A few notes which relate to preliminary results of a comparison of the reaction of maize, wheat, and sorghum to weather influence.
- and others. (2069)
 CLIMATIC EFFECTS IN THE METABOLISM OF THE SUGAR BEET. Jour. Agr. Research 33: 59-75. July 1, 1926.
 "Results are presented for diurnal changes of chemical composition in leaf blades of the sugar mangold and sugar beet, and in the petiole and root of the latter plant . . . [which] explain practical observations that cool, fair weather . . . is favorable to the storing of high percentages of sugar in the root of the sugar beet."
- TOUMEX, JAMES W. (2070)
 THE VEGETATION OF THE FOREST FLOOR; LIGHT VERSUS SOIL MOISTURE. Internat. Cong. Plant Sci. Proc. 1: 575-590. Ithaca, N. Y., 1926.
 The author combats the prevalent assumption that light is the controlling factor in the germination and early growth of tree seedlings in forests.
- and NEETHLING, ERNEST J. (2071)
 INSOLATION, A FACTOR IN THE NATURAL REGENERATION OF CERTAIN CONIFERS. 63 p. New Haven, Yale University Press, 1924. (Yale Univ. School Forestry Bul. 11.)
 "The primary object in view in making and recording the investigations herein set forth was to learn to what extent the survival of white pine seedlings, during the season following germination in the field, is inhibited by insolation and by the drying of the surface soil and what the climatic and cover conditions are that control losses by each. The question requiring solution is: To what extent can losses due to insolation and surface soil desiccation be controlled by the nature and density of the vegetative cover?"

TOUMEY, JAMES A., and NEETHLING, ERNEST J.—Continued. (2072)

SOME EFFECTS OF COVER OVER CONIFEROUS SEEDBEDS IN SOUTHERN NEW ENGLAND. 39 p. New Haven, Yale University Press. 1923. (Yale Univ. School Forestry Bul. 9.)

"The object of the study as at first conceived was to secure experimental data under the climatic conditions of southern Connecticut: 1. On the effect of shade as compared with full light on the time required for germination, and on germination values in representative conifers, and on survival and growth during the first season. 2. On the effect of mulch as compared with exposed soil on the time required for germination, and on germination values in representative conifers, and on survival and growth during the first season." Attention is called to the importance of weather conditions during germination, when the controlling factors are heat, moisture, and air.

TOURNOIS, J. (2073)

INFLUENCE DE LA LUMIÈRE SUR LA FLORAISON DU HOUBLON JAPONAIS ET DU CHANVRE. *Compt. Rend. Acad. Sci. [Paris]* 155: 297-300. July 22, 1912.

Experiments are described which seem to indicate that the flowering of hemp and Japanese hops is in inverse ratio to the amount of light to which they are exposed after germination.

TRACY, W. W. (2074)

THE INFLUENCE OF CLIMATE AND SOIL ON THE TRANSMITTING POWER OF SEEDS. *Science (n. s.)* 19: 738-740. May 6, 1904.

The author decides from personal observation that the seeds of leguminous plants or of cucurbits are not influenced by climate, but that climatic condition does have a marked influence on the seed of corn.

TRANSEAU, E. N. (2075)

CLIMATIC CENTERS AND CENTERS OF PLANT DISTRIBUTION. *Mich. Acad. Sci. Ann. Rpt.* 7: 73-75. 1905.

"The conclusion seems warranted that a map based on rainfall-evaporation ratios (since they involve four climatic factors: temperature, relative humidity, wind velocity, and rainfall) will show climatic centers which coincide approximately with the centers of plant distribution."

TRÉFAULT, B. (2076)

LES BLÉS ET LES GELÉES DE DÉCEMBRE 1927. *Jour. Agr. Prat.* 50: 29-30. July 14, 1928.

Not seen.

Effect of frost on wheat.

TRELEASE, SAM F. (2077)

NIGHT AND DAY RATES OF ELONGATION OF BANANA LEAVES. *Philippine Jour. Sci.* 23: 85-96. July, 1923.

"The present paper aims to illustrate, by means of a series of measurements, the relative elongation rates of leaves of a banana . . . locally known as latundan, by day and by night, and to present some observations on variations in leaf position that appear to be related to corresponding variations in foliar water content."

TRINCHIERI, GIULIO. (2078)

OSSERVAZIONI SUI DANNI ARRECATI ALLE PIANTE DELL' ORTO BOTANICO DI NAPOLI DA UN REPENTINO ABBASSAMENTO DI TEMPERATURA. *Naples Univ. Bul. Orto Bot.* 2: 543-559. 1910.

An account of the effect of a sudden drop in temperature on the plants in the botanic garden of Naples.

TRIVETT, JOHN B. (2078a)

WHEAT-GROWING IN RELATION TO RAINFALL. MEMORANDUM REGARDING THE AREA OF NEW SOUTH WALES SUITABLE FOR WHEAT-GROWING. Published by authority of the Government of the State of New South Wales. 5 p. Sydney, William Applegate Gullick, Govt. printer, 1912.

TROITSKII (TROITZKY), N. N. (2079)

A GRAPHIC REPRESENTATION OF THE WEATHER IN CONNECTION WITH THE GROWTH OF GRAIN CROPS. *Izv. Gosud Inst. Opytn. Agron. (Ann. State Inst. Expt. Agron. [Leningrad])* 5: 283-287. 1927.

In Russian. Not examined. Reference given as found.

Abstract in *Expt. Sta. Rec.* 58: 512. April, 1928. Abstract number.

Certain groupings of frost-free days are given "with reference to optima for certain physiological processes in plants . . . Following these groupings the author shows graphically the weather conditions, such as temperature, sunlight, and rainfall, favorable for the growth of barley."

- TROUPEAU-HOUSAY, J. (2080)
LES BLÉS ET L'HIVER 1928-1929 DANS LA RÉGION DE PARIS. Jour. Agr. Prat.
51: 329-331. April 27, 1929.
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The effect of the winter of 1928-29 on wheat.
- TROWBRIDGE, CHARLES C. (2081)
THE COEFFICIENT OF EXPANSION OF LIVING TREE TRUNKS. Science (n. s.)
48: 348-350. Oct. 4, 1918.
The influence of temperature on contraction and expansion of tree
trunks is studied; also frost cracks.
- THE THERMOMETRIC MOVEMENTS OF TREE BRANCHES AT FREEZING TEMPERA-
TURES. Bul. Torrey Bot. Club 43: 29-56. Jan., 1916.
The relation of air temperature and humidity to changes of position
in the branches of linden trees is discussed.
- TRUFFAUT, GEORGES (2083)
INFLUENCE DES RADIATIONS SUR LA VÉGÉTATION. Jardinage 14: 163-166.
Mar., 1927.
The effect of solar radiation on garden plants is briefly discussed.
- TRUMPF, CHRISTIAN. (2084)
UEBER DEN EINFLUSS INTERMITTIERENDER BELICHTUNG AUF DAS ETIOLEMENT DER
PFLANZEN. Bot. Arch. 5: 381-410. Mar., 1924.
This is a discussion of the influence of intermittent light on etiolated
plants.
- TUBEUF, KARL VON. (2085)
FROSTWIRKUNGEN AUF LAUBBLÄTTER. Naturw. Ztschr. Land-u. Forstw.
2: 293-295. July, 1904.
A brief account of the effect of frost on leaves.
- TUFTS, WARREN P. (2086)
SEASONAL TEMPERATURES AND FRUIT RIPENING: A PRELIMINARY REPORT. Amer.
Soc. Hort. Sci. Proc. Ann. Meeting 26: 163-166. Des Moines, Iowa, Dec.
30, 1929-Jan. 1, 1930.
"The data herewith presented are part of those being collected in a
study of the influence of temperature, aside from the question of early
spring frosts, not only on the time of ripening but also on the more
general problem of what has been the rôle of temperature in determining
the permanent location of profitable fruit districts. The particular study
reported here in a preliminary way concerns itself with three apricot
orchards."
- TUMANOV, IVAN I. (2087)
DEFICIENCY OF WATER SUPPLY AND WILTING OF THE PLANT AS MEANS OF IN-
CREASING ITS DROUGHT RESISTANCE. Trudy Prikl. Bot. i Selek. (Bul. Appl.
Bot. and Plant Breeding) 16: 193-399. 1926.
In Russian, with English summary.
- UNGENÜGENDE WASSERVERSORGUNG UND DAS WELKEN DER PFLANZEN ALS MITTEL
(2088)
ZUR ERHÖHUNG IHRER DÜRRERESISTENZ. Planta Arch. Wiss. Bot. 3: 391-
480. Mar. 1927.
Insufficient water supply and the wilting of plants as a means of
increasing their drought resistance.
- WELKEN UND DÜRRERESISTENZ. Wiss. Arch. Landw., Abt. A. Pflanzenbau 3:
(2089)
389-419. Apr. 24, 1930.
Wilting as a means of resisting drought is studied in the case of certain
grain and forage plants.
- WILTING AND DROUGHT RESISTANCE. Bul. Appl. Bot. and Plant Breeding 22:
(2090)
107-146. 1929.
In Russian, with English summary.
- TURPIN, H. W., and SMUTS, I. J. (2091)
DROUGHT-RESISTANT FODDERS. Jour. Dept. Agr., So. Africa 11: 256-273.
Sept., 1925.
The effect of drought on the cactus, aloe, and saltbush is discussed.

- TUTUMI, KENROKU. (2092)
 SERICULTURE AND WEATHER. Jour. Met. Soc. Japan 43: 174-184. 1924.
 In Japanese. Abstract in Japan. Jour. Astron. and Geophysics Abs. v. 3, no. 3, p. 29. 1926.
 The author studies the advantageous and disadvantageous influences of weather on sericulture and calculates the correlation coefficients between the cocoon crops and the average weather elements for the years 1907-1920.
- TYSDAL, H. M., and SALMON, S. C. (2093)
 VISCOSITY AND WINTER HARDINESS IN THE SMALL GRAINS. Jour. Amer. Soc. Agron. 18: 1099-1100. Dec. 1926.
- ÜBER DEN RHYTHMISCHEN WECHSEL VON WACHSTUM UND RUHE BEI DEN PFLANZEN. Biol. Centbl. 35: 401-471. Oct. 20, 1915. (2094)
 The author shows that periodicity is the effect of external rather than internal factors.
- UMHAUER. (2095)
 DER EINFLUSS DES FRÜHFROSTES 1919 AUF UNSERE OBSTBÄUME. Ztschr. Obst. Wein u. Gartenbau [Dresden] (N. F.) 46: 146-147. Oct., 1920.
 A brief account of the effect of the early frost of 1919 on fruit trees.
- UNAKAR, M. V. (2096)
 CORRELATION BETWEEN WEATHER AND CROPS WITH SPECIAL REFERENCE TO PUNJAB WHEAT. Indian Met. Dept. Mem. 25: 145-161. 1929.
 A report on a preliminary study of the weather conditions (temperature and rainfall) prevailing from the time of sowing to the date of maturity of wheat (October to March) in the Punjab.
- UNITED STATES DEPARTMENT OF AGRICULTURE. BUREAU OF AGRICULTURAL ECONOMICS. (2097)
 ATLAS OF AMERICAN AGRICULTURE. Washington, Govt. print. off., 1917-28.
 Advance sheets 1-7.
 Advance sheets 1-5 issued by Office of Farm Management.
 The importance of weather conditions in successful crop production is shown.
- (2098)
 EFFECTS OF METHODS OF HARVESTING AND WEATHER EXPOSURE ON SPINNING QUALITY OF COTTON. (TEXAS AND OKLAHOMA—CROP OF 1926.) A preliminary report. 23 p. [By H. H. Willis.] Washington, D. C., July, 1928. [Mimeographed.]
 In cooperation with Clemson Agricultural College, South Carolina.
 "Each of the three tests herein described is a comparative study of the harvesting methods of picking and snapping as reflected in the grade, waste, and spinning quality of cotton of the same strain and variety grown under similar conditions. The effect of weather exposure and the time element in gathering the crop, as related to spinning quality and the method of harvesting, are supplementary subjects of study."
- (2099)
 METHODS OF FORECASTING NEW ENGLAND POTATO YIELDS. A STUDY OF THE RELATIONSHIP OF YIELDS TO REPORTED CONDITIONS AND WEATHER DATA. A summary of studies made in New England, by Frederick V. Waugh . . . , Chester D. Stevens . . . , [and] Gustave Burmeister.
 As presented to the Crop Statisticians' School and Conference at Washington, D. C., March 20, 1928, by F. V. Waugh. 19 p. Washington, D. C., Feb., 1929. [Mimeographed.]
 This study is limited to the influence of rainfall on yield of potatoes.
- (2099a)
 SOME FACTORS INFLUENCING THE SIZE OF APPLES IN THE HOOD RIVER VALLEY, OREGON. A preliminary report, by S. R. Newell. 17 p. Washington, D. C., Sept., 1929. [Mimeographed.]
 This is a study of apple production in the Hood River Valley from 1914 to 1927. It is shown that in this district in which "moisture during the fruiting season is practically held constant by irrigation and by little variation in summer rainfall, summer temperatures . . . apparently have a marked effect upon the growth and development of the apple . . . The length of season and quantity of summer rainfall apparently exert some

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influence in certain years upon size but their effect is not as pronounced as is the influence of temperature . . . For the period studied it is now possible, with data available each year on August 1, to make a reasonably accurate forecast for each year of the percentage of the total pack of Newtowns, Spitzenburgs, and Arkansas Blacks combined, which will fall into the larger sizes." Tables are appended.

(2099b)

FOREIGN NEWS ON WHEAT. WORLD WHEAT CROPS AND MARKET PROSPECTS. 38 p. June 15, 1929. (F. S.—W. H.—36.)

The effect of precipitation and temperature on the yield of Canadian wheat is studied (p. 10-14).

(2099c)

FOREIGN NEWS ON WHEAT. WORLD WHEAT CROPS AND MARKET PROSPECTS. 33 p. Oct. 21, 1929. (F. S.—W. H.—41.)

The effect of rainfall on the yield of wheat in Australia is studied.

(2099d)

FOREIGN NEWS ON WHEAT. WORLD WHEAT CROPS AND MARKET PROSPECTS. 30 p. Dec. 20, 1929. (F. S.—W. H.—44.)

Contains a study of the relation of Argentine wheat yields to weather during and preceding the growing season. "The analysis on which the 1929 yield is based is the result of a multiple curvilinear correlation for the period 1896 to 1928, using six weather factors; monthly mean temperatures averaged for two stations Cordoba and Bahia Blanca for the months July, August, September, and October, and total rainfall at Cordoba for two periods, February to May, inclusive, and June to August, inclusive." (p. 28-29).

A UNIVERSAL DELUSION REGARDING THE EFFECT OF COLD ON PLANTS. Current Opinion 72: 90-92. Jan., 1922. (2100)

A discussion of Professor Coville's theory.

UNSTEAD, J. F. (2101)

THE CLIMATIC LIMITS OF WHEAT CULTIVATION, WITH SPECIAL REFERENCE TO NORTH AMERICA. Geogr. Jour. 39: 347-366, 421-446. 1912.

The author discusses the effect of temperature and rainfall on the cultivation of wheat.

UPHOF, J. C. T. (2102)

COLD-RESISTANCE AN ECOLOGICAL FACTOR IN THE GEOGRAPHICAL DISTRIBUTION OF CACTI. Jour. Ecology 8: 41-53. Mar., 1920.

"The following paper gives the results of a study of the various degrees of resistance to cold of different species of cacti, growing in the deserts of Arizona."

(2103)

COLD RESISTANCE IN SPINELESS CACTI. p. 119-144. Tucson, 1916. (Ariz. Agr. Expt. Sta. Bul. 79.)

URBAN, JOSEF. (2104)

ÜBER ÄNDERUNGEN IM ZUCKERGEHALT UND IN DER WACHSTUMSGESCHWINDIGKEIT DER RÜBEN ALS FOLGE VERSCHIEDENER WASSERNIEDERSCHLÄGE. Ztschr. Zuckerindus., Čechoslovák. Repub. 49: 299-305, 307-312. 1925.

The writer has correlated the results of 6,200 analyses of beet samples made during 5 years in sugar factories in Czechoslovakia with the rainfall conditions.

THE USE OF WIND-BREAKS. Agr. News [Barbados] 10: 1-3. Jan. 7, 1911. (2105)

Contains a discussion of the use of wind-breaks in the West Indies to prevent retardation of the growth of plants by exposure to wind.

VAGELER, P. (2106)

DER EINFLUSS DER KLIMATISCHEN FAKTOREN AUF DIE VEGETATION IM ALLGEMEINEN UND SPEZIELL AUF DIE HÖHE DES PFLANZENETRAGES. Tropenpflanzer 15: 289-302. June, 1911.

Abstract in Expt. Sta. Rec. 25: 617. Nov., 1911.

"The influence of heat, light, and moisture upon the growth of plants, with particular reference to tropical conditions discussed."

VAGHOLKAR, B. P. (2107)

GINNING PERCENTAGE OF COTTON IN ITS RELATION TO SEASON. Agr. Jour. India 16: 690-691. Nov., 1921.

The observations made by the writer in Khandesh indicate "the shorter the rainfall, the lower the ginning percentage."

- VAN CLEEF, EUGENE. (2108)
THE SUGAR BEET IN GERMANY, WITH SPECIAL ATTENTION TO ITS RELATION TO CLIMATE. *Bul. Amer. Geogr. Soc.* 47: 241-258, 334-341. 1915.
Among the climatic elements which determine the development of a profitable sugar-beet crop are temperature, rainfall, sunshine, wind, and relative humidity.
- VAUGHAN, R. E., and MILLER, M. (2109)
FREEZING INJURIES TO POTATO TUBERS. 4 p. Madison, 1919. (*Wis. Col. Agr. Ext. Serv. Circ.* 120.)
- VAUGHN, LLOYD D. (2110)
PROBLEMS ON THE RELATION BETWEEN WEATHER AND CROPS. *U. S. Mo. Weather Rev.* 48: 641-643. Nov., 1920.
A brief study of the relation of temperature and rainfall to plant growth.
"Crop responses to the relationship of temperature and precipitation are so consistent that, other things being equal, the temperature-precipitation ratio of the growing-season can almost be taken as an index of crop conditions . . . A favorable temperature-precipitation ratio—that is, high temperature and low rainfall—is normally accompanied by a relatively high percentage of sunshine, high light intensity, and low humidity, each of which would have a favorable bearing on crop conditions."
- VENABLE, W. H. (2111)
THE GNARLY APPLE DISEASE OF 1914. p. 12-13. Burlington, 1917. (*Vt. Agr. Expt. Sta. Bul.* 203.)
Due to a late May frost injury occurring coincident with the blossoming period.
- VERNER, LEIF. (2112)
SOME CLIMATIC INFLUENCES IN THE APPLE INDUSTRY OF SWEDEN. *Amer. Soc. Hort. Sci. Proc.* 1928: 293-297.
- VERRET, J. A. (2113)
THE EFFECT OF HEAT ON THE GERMINATION OF SUGARCANE CUTTINGS. *Hawaii, Planters' Rec.* 31: 112-115. Apr., 1927.
- and McLENNAN, R. H. (2114)
THE EFFECT OF SUNLIGHT ON CANE GROWTH. *Hawaii, Planters' Rec.* 31: 116-117. Apr., 1927.
"Any lessening in normal illumination is detrimental to maximum sugarcane growth in June and July."
- and McLENNAN, R. H. (2115)
EFFECT OF WIND ON CANE GROWTH. *Hawaii, Planters' Rec.* 31: 335-341. Oct., 1927.
- VERSLUYS, MARTHA C. (2116)
DE PERIODICITEIT VAN DE KNOPONTWIKKELING BIJ DEN KERS. *Meded. Landbouwhoogeschool [Wageningen]* 18: 149-191. 1921.
English summary, p. 180-185.
"On the periodicity and the development of the bud in the cherry."
- VIBAR, TORIBIO. (2117)
THE RELATION OF TEMPERATURE AND MOISTURE TO DISEASED AND DISEASE-FREE CORN. *Philippine Jour. Sci.* 31: 169-213. Oct., 1926.
"The relationship of temperature and moisture to the growth of diseased and disease-free corn follows the law of limiting factors."
- VIGLIANI, GIOACCHINO. (2118)
L'ECOLOGIA NEI SUOI RAPPORTI CON L'AGRICOLTURA. *Ital. Agr.* 66: 157-162. Mar., 1929.
A general discussion of the importance to the agriculturist of a knowledge of the relations of weather conditions to crops.
- VIGLIONE, A. (2119)
EFECTOS DE LAS HELADAS SOBRE LA CAÑA DE AZÚCAR. *Hacienda* 22: 374. Dec., 1927.
Not seen.
Effect of frost on sugar cane.
- VIGOR, H. D. (2120)
CROP ESTIMATES IN ENGLAND. *Jour. Roy. Statis. Soc. [London]* 91: 1-49. 1928.
Some of the literature on the influence of weather on crops is reviewed.

VILMORIN, JACQUES DE.

(2121)

ESSAIS ET OBSERVATIONS SUR LES BLÉS À VERRIÈRES, EN 1917. *Compt. Rend. Acad. Agr. France* 3: 1077-1085. Nov. 28, 1917.

Seventy-three varieties of wheat are classified according to resistance to cold in the winter of 1916-17.

(2122)

RÉSULTATS DE QUELQUES EXPÉRIENCES DE BLÉS EN 1921. *Compt. Rend. Acad. Agr. France* 8: 311-312. Mar. 1, 1922.

A very brief account of the effect of the excessive heat and dryness of 1921 on wheat crops grown at Verrières.

— and CAZAUBON, EMMANUEL.

(2123)

LES FACTEURS MÉTÉOROLOGIQUES ET LA FORMATION DU SUCRE CHEZ LA BETTERAVE. *Assoc. Chim. Sucr. et Distill. France et Colon. Bul.* 43: 159-166. Nov., 1925.

Abstract in *Expt. Sta. Rec.* 55: 415. Oct., 1926.

"From observations made during 1922-1925 the conclusion is drawn that the first 3 months of growth of sugar beet are the most influential in determining the yield of roots and sugar, the weather of the month of August furnishing the most reliable basis for predicting the yield of roots and leaves and the sugar content of the roots."

VINALL, H. N., and REED, H. R.

(2124)

EFFECT OF TEMPERATURE AND OTHER METEOROLOGICAL FACTORS ON THE GROWTH OF SORGHUMS. *Jour. Agr. Research* 13: 133-147. April 8, 1918.

The effect of sunshine and temperature on the growth of sorghums is studied. "Adverse weather conditions affect such supposedly stable characters as the number of leaves per plant, as well as the volume of growth."

VINSON, A. E.

(2125)

THE EFFECT OF CLIMATIC CONDITIONS ON THE RATE OF GROWTH OF DATE PALMS. *Bot. Gaz.* 57: 324-327. Apr., 1914.

Observations made at Tempe, Ariz., indicate that the rate of growth of the date palm is greatest at the period of the "highest minimum temperatures . . . Humidity is undoubtedly an important factor, but probably less so to date palms than to other plants."

VINSON, C. G.

(2126)

GROWTH AND COMPOSITION OF SOME SHADED PLANTS. *Amer. Soc. Hort. Sci. Proc.* 1923: 293-294.

VISHER, STEPHEN SARGENT.

(2127)

RAINFALL CONDITIONS AS HANDICAPS TO TROPICAL DEVELOPMENT, WITH SPECIAL MENTION OF AUSTRALIA AND THE PACIFIC. *Geogr. Rev.* 15: 457-465. July, 1925.

Read at the twenty-first annual meeting of the Association of American Geographers at Washington, D. C., Dec. 30, 1924-Jan. 1, 1925.

"It appears that the development of many tropical regions is rather seriously handicapped by rainfall conditions, and, before these regions can be developed advantageously, the rainfall conditions must be well known and adjustments to them wisely worked out."

VLASOV, V. A.

(2128)

AGRICULTURAL METEOROLOGICAL OBSERVATIONS ON THE POLTAVA EXPERIMENT FIELD, 1886-1900. *Itoghi Rabot Poltavskagho Opytn. Polya za Dvadtzat Lyet, 1886-1905.* v. 1, p. 1-42; appendix. p. 1-32. Poltava, 1908.

Abstract in *Expt. Sta. Rec.* 23: 219-220. Sept., 1910.

"This is a report on observations on the relation of meteorological conditions (precipitation and temperature) to the growth of cereals under semiarid conditions . . . Briefly stated, a good season for summer cereals is distinguished by a relatively large amount of precipitation and a rather low temperature from the time of germination to heading and a relatively large amount of heat and light with smaller precipitation after the period of heading . . . The quantity and quality of winter cereals depended mainly on the precipitation during the period from seeding to the beginning of winter."

VOGES, ERNST.

(2129)

ÜBER HAGELSCHLAGWUNDEN AN OBSTGEWÄCHSEN. *Ztschr. Pflanzenkrank.* 22: 457-462. Dec. 28, 1912.

Hail injury to fruit trees is investigated.

- VOGES, ERNST—Continued. (2130)
DIE WITTERUNG UND DIE FUSSKRANKHEIT DES GETREIDES. Deut. Landw. Presse
30: 993-994. Oct. 15, 1913.
The effect of weather conditions on grain disease is discussed.
- VOGL, JOSEPH. (2131)
DER LICHTUNGSBETRIEB. Forstw. Centbl. 50: 361-374. June 1, 1928.
Economic advantages of forest thinning and consequent light penetration are cited.
- VOGLINO, PIETRO. (2132)
L'AZIONE DEL FREDDO SULLE PIANTE COLTIVATE SPECIALMENTE IN RELAZIONE
COL PARASSITISMO DEI FUNGHI. Ann. R. Accad. Agr. Torino, 46: 57-72.
1903.
The action of cold on plants is discussed.
- VOGT, ERNST. (2133)
ÜBER DEN EINFLUSS DES LICHTS AUF DAS WACHSTUM DER KOLEOPTILE VON AVENA
SATIVA. Ztschr. Bot. 70: 193-270. 1915.
The author points out the stimulating effect of light on the coleoptile
of *Avena sativa*.
- VOIGTLÄNDER, HANS. (2134)
UNTERKÜHLUNG UND KÄLTETOD DER PFLANZEN. Cohn Beiträge zur Biologie
der Pflanzen 9: 359-414. 1909.
The effect of low temperatures on plant life is discussed.
- VOORHEES, J. F. (2135)
RELATION OF METEOROLOGICAL STUDY TO MORE LOGICAL SYSTEMS OF CROPPING
AND TO CROP PRODUCTION. Soc. Prom. Agr. Sci. Proc., 1912: 87-101.
The relation of temperature and moisture conditions to plant growth
and the effect on cropping systems is discussed.
- (2136)
RELATION OF TEMPERATURE AND RAINFALL TO CROP SYSTEMS AND PRODUCTION.
23 p. Knoxville, 1911. (Tenn. Agr. Expt. Sta. Bul. 91.)
- WAGER, HAROLD. (2137)
BEHAVIOUR OF PLANTS IN RESPONSE TO LIGHT. Nature [London] 96: 468-472.
Dec. 23, 1915.
- WAGGONER, H. D. (2138)
THE VIABILITY OF RADISH SEEDS (*RAPHANUS SATIVUS* L.) AS AFFECTED BY HIGH
TEMPERATURES AND WATER CONTENT. Amer. Jour. Bot. 4: 299-313. May,
1917.
The author discusses the relation between the water content of radish
seeds exposed to high temperatures and their viability, and the degree
of resistance of seeds exposed to high temperatures when treated by
different methods.
- WAGNER, J. P. (2139)
LES CAUSES PROBABLES DE LA RÉCOLTE DÉFICITAIRE FRUITIÈRE DE 1926. Compt.
Rend. Acad. Agr. France 13: 17, 553-556. May 11, 1927.
The author attributes the deficient fruit crop of 1926 to the cold wet
weather during May and June of that year.
- (2140)
INFLUENCE DES ANNÉES HUMIDES ET DES ANNÉES SÈCHES SUR LA RÉCOLTE
FRUITIÈRE. Compt. Rend. Acad. Agr. France 14: 260-262. Feb. 22, 1928.
A discussion of the effect of warm, dry weather and of cold, wet
weather on fruit yield.
- WAGNER, KARL. (2141)
SCHNEE UND KÄLTETOD DER PFLANZEN. Gartenschönheit 8: 23-24. Jan.,
1927.
Snow and the death of plants from cold.
- WAGNER, MAX. (2142)
PFLANZENPHYSIOLOGISCHE STUDIEN IM WALDE. 177 p. Berlin, P. Parey, 1907.
Discusses the effect of light, shade, temperature, atmospheric humidity,
and frost on forest trees.
- WAHLENBERG, W. G. (2143)
FALL SOWING AND DELAYED GERMINATION OF WESTERN WHITE PINE SEED.
Jour. Agr. Research 28: 1127-1131. June 14, 1924.
Experiments showed that the best time for sowing white pine seed
in western Montana is during the first two weeks in September. August
sowings are subject to premature germination, and seedlings germinating
prematurely do not survive the winter.

- WAINSTEIN, ALBERT L. (2144)
 METEOROLOGISCHE UND WIRTSCHAFTLICHE ZYKLEN, PROBLEME DER WIRTSCHAFTS-
 PROGNOSE. Inst. Konjunkturforschung. Vrtljh. Konjunkturforschung
 Sonderheft 12: 5-43. 1929.
 The author discusses the question of the relation between economic
 cycles and periodicity of harvests and the connection between rainfall
 and crop yield and price. The literature of the subject is discussed.
- WAITE, MERTON B. (2145)
 FRUIT TREES FROZEN IN 1904. U. S. Dept. Agr., Bur. Plant Indus. Bul. 51,
 p. 15-19. 1905.
 The damage done to peach, Japanese plum, and pear trees by a recent
 frost is discussed.
- PEACH YELLOWS AND FROST INJURY. Science (n.s.) 31: 798-799. May 20,
 1910. (2146)
 Abstract of paper read before American Phytopathological Society. (2147)
- WEATHER'S INFLUENCE ON PLANT DISEASES IMPORTANT AND FREQUENTLY
 DOMINANT. U. S. Dept. Agr. Yearbook 1930: 534-541. 1930.
 The author calls attention to the fact that weather conditions, especially
 the extremes, have a profound effect upon parasitic and virus diseases
 of plants and may be the main cause of nonparasitic diseases. A brief
 account is given of some injuries or diseases caused by temperature,
 precipitation (dew, rain, hail, snow, sleet), relative humidity, and wind. (2148)
- WINTER INJURY TO PEACHES IN MID-WEST. U. S. Dept. Agr., Bur. Plant
 Indus. Plant Disease Rptr. 14 (3): 24-25. Feb. 1, 1930. [Mimeo-
 graphed.]
 Means of identifying winter injury to fruit trees are suggested.
- WAKAR, B. (2149)
 ZUR FRAGE ÜBER DIE FESTIGKEIT ZUR DÜRRE DES TRITICUM VULGARE HOST.
 (SOMMERWEIZENS) UND DES TRITICUM DURUM DESF. Jour. Landw. Wiss. 4:
 439-449. 1927.
 Winter hardness of summer wheat.
- WALDO, GEORGE F. (2150)
 FRUIT-BUD FORMATION IN EVERBEARING STRAWBERRIES. Jour. Agr. Research
 40: 409-413. Mar. 1, 1930.
 "The almost entire absence of developing flower stalks over a period
 of three or four weeks immediately following the spring crop, together
 with the existence of favorable temperatures and long days, are sug-
 gested as the causes of the unusual activity of everbearing straw-
 berries in producing runners, new branches, and differentiating fruit
 buds all at this time."
- WALDRON, L. R. (2151)
 HARDINESS IN SUCCESSIVE ALFALFA GENERATIONS. Amer. Nat. 46: 463-469.
 Aug., 1912.
 "The relations that different strains of alfalfa have to the cold of
 severe winters" is investigated.
- INFLUENCE OF VARIEGATION IN ALFALFA UPON HARDINESS. Amer. Breeders'
 Assoc. Ann. Rpt. 7-8: 424-429. 1912. (2152)
- A SECOND REPORT ON THE COLD RESISTANCE OF ALFALFA. Amer. Breeders'
 Assoc. Ann. Rpt. 7-8: 127-142. 1912. (2153)
- WALKER, JOHN C. (2154)
 SEED TREATMENT AND RAINFALL IN RELATION TO THE CONTROL OF CABBAGE
 BLACK-LEG. 27 p. Washington, D. C., 1922. (U. S. Dept. Agr. Bul. 1029.)
 The results are given of a study of the effect of variation in the depth
 of rainfall on the development of the disease among seeds.
- and SMITH, ROSE. (2155)
 EFFECT OF ENVIRONMENTAL FACTORS UPON THE RESISTANCE OF CABBAGE TO
 YELLOWS. Jour. Agr. Research 41: 1-15. July 1, 1930.
 The influence of air temperature is discussed.
- and WELLMAN, F. L. (2156)
 RELATION OF TEMPERATURE TO SPORE GERMINATION AND GROWTH OF UROCYSTIS
 CEPULAE. Jour. Agr. Research 32: 133-146. Jan. 15, 1926.

- WALKER, JOHN C., and WELLMAN, F. L.—Continued. (2157)
TEMPERATURE RELATIONS OF UROCYSTIS CEPULAE (FROST). (Abstract.) Phytopathology 14: 26. Jan., 1924.
Abstract of a paper presented at the fifteenth annual meeting of the American Phytopathological Society, Cincinnati, Ohio, Dec. 27, 1923, to Jan. 1, 1924.
"The relation of temperature to germination and growth of the onion smut fungus has been studied."
- WALLACE, ERRETT. (2158)
APPLE SCAB INFECTION AS CORRELATED WITH MATURITY OF ASCOSPORES, WEATHER CONDITIONS AND DEVELOPMENT OF FRUIT BUDS. (Abstract.) Phytopathology 2: 94-95. Apr., 1912.
Abstract of a paper presented at the third annual meeting of the American Phytopathological Society, Washington, D. C., Dec. 27-28, 1911.
- WALLACE, H. A. (2159)
MATHEMATICAL INQUIRY INTO THE EFFECT OF WEATHER ON CORN YIELD IN THE EIGHT CORN-BELT STATES. U. S. Mo. Weather Rev. 48: 439-446. Aug., 1920.
"The object of this paper is to examine . . . the relation between corn yield, rainfall, and temperature in the months of May, June, July, and August in each of the eight corn-belt states, for the most part . . . by means of correlation coefficients, multiple coefficients of correlation, and lines of regression." The investigation covers the period from 1891 to 1919.
- WALLACE, THOMAS. (2160)
AN EXPERIMENT ON THE WINTER-KILLING OF VEGETABLE CROPS IN MARKET GARDENS. Jour. Bath and West and South. Counties Soc. (6) 1: 190-194, 1926-1927.
"The problem of the winter-killing of vegetable crops in market gardens in the district around Bristol is discussed in relation to the current manurial practice."
- FROST INJURY TO APPLE TREES. Gard. Chron. (3) 85: 209-210. Mar. 16, 1929. (2161)
Particulars of injury at Long Ashton are given.
- WALLDÉN J. N. (2162)
YTRE ORSAKERS OCH ÄRFTLIGA ANLAGS INVERKAN PÅ GRONINGSFÖRMÅGAN. Sveriges Utsädesför. Tidskr. 26: 146-162. 1916.
Abstract in Internatl. Rev. Sci. and Pract. Agr. [Rome] 8: 340-341, Mar., 1917; Expt. Sta. Rec. 38: 15. 1918.
"Copious rain and a low temperature during the period of ripening and harvest stimulate the development of the grain, which subsequently germinates in storage or even in the shock. The degree of sensitiveness varies according to the species, but is maximum in rye, which two days' rain are sufficient to germinate. For wheat, barley, oats marked differences are noted between different varieties. . . . Seeds matured during dry weather ripen more quickly and germinate better than those ripening during wet weather."
- WALLÉN, AXEL. (2163)
L'INFLUENCE DE LA TEMPÉRATURE ET DE L'EAU TOMBÉE SUR LES RÉCOLTES DE QUELQUES VARIÉTÉS DE FROMENT À SVALÖF ET À ULTUNA. Geogr. Ann. 2: 332-357. 1920.
The author studies the relation between temperature and rainfall and certain varieties of wheat in two districts of Sweden.
- SAMBANDET MELLAN KLIMAT OCH SKÖRD I SVERIGE. Ymer 38: 1-23. 1918. (2164)
Abstract in Internatl. Rev. Sci. and Pract. Agr. [Rome] 9: 1401-1404. Dec., 1918.
"The author has calculated for every province of Sweden the coefficient of correlation between the monthly temperature, monthly rainfall, and yield in grain of barley, oats, wheat, and rye."
- SUR LA CORRÉLATION ENTRE LES RÉCOLTES ET LES VARIATIONS DE LA TEMPÉRATURE ET DE L'EAU TOMBÉE EN SUÈDE. K. Svenska Vetensk. Akad. Handl. (n. f.) bandet 57, no. 8, 87p. 1917. (2165)
Discusses various methods of establishing relations between crops and rainfall and temperature in Sweden, and studies the effect of temperature and rainfall on wheat, barley, rye, and oats from 1881 to 1910.

- WALLER, ADOLPH E. (2166)
CROP CENTERS OF THE UNITED STATES. Jour. Amer. Soc. Agron. 10: 49-83. Feb., 1918.
In studying the relation of vegetation to evaporation and rainfall, the author finds that the rainfall-evaporation ratio, combining the four factors of relative humidity, temperature of the evaporating surface, wind velocity, and precipitation, agrees closely with the known types of vegetation of the United States.
- WALLIS, B. C. (2167)
RAINFALL AND AGRICULTURE IN THE UNITED STATES. U. S. Mo. Weather Rev. 43: 267-274. June, 1915.
The author studies the importance of rainfall in the production of wheat, rye, barley, oats, maize, tobacco, and cotton.
- THE RAINFALL OF THE COTTON BELT OF THE UNITED STATES AND ITS RESULTS. (2168)
Scot. Geogr. Mag. 31: 71-81. Feb., 1915.
"This investigation reveals how closely [the farmer's] success is bound up with 'the march of the sun in the sky,' his temperatures and his rainfall are both largely conditioned by solar influences, and where these influences are subject to modification or interference he adjusts his labours so as to conform to an average standard."
- WALSTER, H. L. (2169)
FORMATIVE EFFECT OF HIGH AND LOW TEMPERATURES UPON GROWTH OF BARLEY: A CHEMICAL CORRELATION. Bot. Gaz. 69: 97-126. Feb., 1920.
"The investigation here reported is a study of the effects of high and low temperatures and concomitant variations in the supply of nitrogen, phosphorus, and potassium respectively upon the course of development of the barley plant. A chemical correlation has been established between temperature and nutrition effects."
- RUST AND THE WEATHER. Science (n. s.) 53: 346. Apr. 8, 1921. (2170)
Abstract of paper read at meeting of American Society of Agronomy, Dec., 1920.
At Fargo, N. Dak., "when high rainfall occurred in good years danger of rust has been offset by low temperatures. When excessively high temperatures have occurred in good years, danger of rust has been offset by droughty conditions."
- WALTER, A. (2171)
THE RELATION BETWEEN SUGAR CROPS AND WEATHER. (Royal Alfred Observ. [Mauritius] Misc. Pub. 5, 10 p. 1922.
"Further investigation into the relation between the meteorological elements and the sugar crop in Mauritius."
- THE SUGAR INDUSTRY OF MAURITIUS: A STUDY IN CORRELATION, INCLUDING A SCHEME OF INSURANCE OF THE CANE CROP AGAINST DAMAGE CAUSED BY CYCLONES. 228 p. London, L. Humphreys, 1910. (2172)
"The present investigation has for its object the determination of the relative effects of rainfall, temperature, and cyclonic wind velocity on the [sugar cane] crop." p. 53.
- WALTER, HEINRICH. (2173)
DIE OSMOTISCHEN WERTE UND DIE KÄLTESCHÄDEN UNSERER WINTERGRÜNEN PFLANZEN WÄHREND DER WINTERPERIODE 1929. Ber. Deut. Bot. Gesell. 47: 338-348. June 27, 1929.
Cold damage to evergreen plants in Germany during the months of January and February, 1929.
- DIE WINTERSCHÄDEN AN UNSEREN IMMERGRÜNEN PFLANZEN WÄHREND DER KÄLTEPERIODE JANUAR-MÄRZ 1929 UND IHRE URSACHEN. Naturwissenschaften 17: 854-859. Nov. 1, 1929. (2174)
An account of winter injury to evergreen plants during the cold period of January-March, 1929.
- WALTHER, OSKAR A. (2175)
ZUR TEMPERATURABHÄNGIGKEIT DER ASSIMILATION BEI VICIA FABA. Flora (n. s.) 21: 301-315. 1927.
The influence of sunlight and temperature on assimilation in *Vicia faba* is studied.

- WALTON, C. L. (2175a)
THE EFFECT OF GEOGRAPHICAL CONDITIONS ON AGRICULTURE. Scot. Geogr. Mag. 34: 415-428. Nov., 1918.
Contains a general discussion of the influence of climate on agriculture.
- WALTON, RICHARD C. (2176)
CAUSE OF PEACH DROP IN 1924. Penn. State Hort. Assoc. News 2: 71-75. Mar., 1925.
A paper, read at the meeting of the Pennsylvania State Horticultural Association in 1925, discounts the theory that peach cankers are due to winter injury and attributes them in part to cold, wet spring weather. (2177)
- THE RELATION OF TEMPERATURE TO THE EXPULSION OF ASCOSPORES OF *ENDOTHIA PARASITICA*. (Abstract.) Phytopathology 4: 52. Feb., 1914.
Abstract of a paper presented at the fifth annual meeting of the American Phytopathological Society, Atlanta, Ga., Dec. 30, 1913-Jan. 2, 1914.
"At the lowest temperatures employed [in making tests] there was no expulsion of spores, but at higher temperatures there was a gradual increase in amount until the optimum was reached, beyond which the expulsion gradually lessened."
- WALZ, FERDINAND J. (2178)
KILLING FROST AND LENGTH OF GROWING SEASON IN VARIOUS SECTIONS OF KENTUCKY. U. S. Mo. Weather Rev. 45: 348-353. July, 1917.
"This paper presents a summary of the results of a study of the dates of the last killing frost in spring and the first killing frost in fall, taken from the records of the various cooperative and other Weather Bureau Stations" in Kentucky.
- WANSEER, H. M. (2179)
PHOTOPERIODISM OF WHEAT; A DETERMINING FACTOR IN ACCLIMATIZATION. Science (n. s.) 56: 313-315. Sept. 15, 1922.
The author stresses the importance of the effect of daylight on the growth of both spring and winter wheat.
- WARD, ROBERT DEC. (2180)
CLIMATE CONSIDERED ESPECIALLY IN RELATION TO MAN. 372 p. New York, G. P. Putnam's Sons, 1908.
Instances are given of the effect of various weather factors on crops in different climatic zones. (2180a)
- CLIMATOLOGY AND SOME OF ITS APPLICATIONS. Sci. Mo. 28: 156-171. Feb., 1929.
The author defines climate as "average weather, the sum-total of all the weather." He devotes a brief section of his article to a discussion of vegetation in connection with the distribution of rainfall and temperature. (2181)
- THE ECONOMIC CLIMATOLOGY OF THE COFFEE DISTRICT OF SÃO PAULO, BRAZIL. Bul. Amer. Geogr. Soc. 43: 428-445. 1911.
The influence of temperature, rainfall, and frost on the coffee crop of São Paulo is discussed. (2182)
- THE LARGER RELATIONS OF CLIMATE AND CROPS IN THE UNITED STATES. Quart. Jour. Roy. Met. Soc. [London] 45: 1-16. Jan., 1919.
Discusses the effect of various weather conditions in the United States on corn, wheat, cotton, hay, tobacco, potatoes, and other crops. (2183)
- WARDLE, R. A. (2183)
THE CLIMATE OF THE SOUTHERN SUDAN IN RELATION TO COTTON GROWING. Manchester Lit. and Phil. Soc. Mem. and Proc. 70: 59-69. 1925-26.
"The essential factors to successful cultivation of cotton are . . . favourable condition of rainfall, sunshine, temperature, and, to a lesser degree, of soil."
- WARE, W. M. (2184)
FROST INJURY TO APPLS. Gard. Chron. (3) 82: 154. Aug. 20, 1927.
- WARMING, EUGENIUS. (2185)
DER WIND ALS PFLANZENGEOGRAPHISCHER FACTOR. ANMERKUNGEN ZU PROF. AD. HANSENS: DIE VEGETATION DER OSTFRIESISCHEN INSELN. Bot. Jahrb.

WARMING, EUGENIUS—Continued.

System. Pflanzengeschichte u. Pflanzengeographie 31: 536-586. Aug. 29, 1902.

A discussion of Prof. Ad. Hansen's book on the vegetation of the E. Frisian Islands in which the effect of wind on vegetation is considered.

(2186)

DIE WINDFRAGE. FORTGESETZTE ANMERKUNGEN ZU PROF. AD. HANSEN'S PUBLICATIONEN ÜBER DEN WIND. Bot. Jahrb. System. Pflanzengeschichte und Pflanzengeographie 32 (Beiblatt nr. 71): 25-36. 1903.

Further remarks on Doctor Hansen's book on the effect of wind on vegetation.

WARTENBERG, HANS.

(2187)

ÜBER PRIMÄRE UND SEKUNDÄRE KÄLTERESISTENZ BEI BOHNENSIPPEN. EINE VORSTUDIE ZUR GENETIK DER KÄLTEEMPFINDLICHKEIT. Planta. Arch. Wiss. Bot. 7: 347-381. Mar. 23, 1929.

A study of cold resistance in beans.

WARTMANN, ÉLIE.

(2188)

NOTE RELATIVE À L'INFLUENCE DE FROIDS EXCESSIFS SUR LES GRAINES. Arch. Sci. Phys. et Nat. [Geneva.] (Nouv. pér.) 8: 277-279. Aug., 1860.

The author shows that the lowest temperature that man can produce does not affect the vitality of seeds. He experimented with seven varieties.

(2189)

RECHERCHES SUR LA VÉGÉTATION. Arch. Sci. Phys. et Nat. [Geneva] (3) 5: 340-344. Apr. 15, 1881.

The effects of atmospheric electricity, ozone, and excessive cold on germination are studied and found to be negligible.

WATT, ANDREW.

(2190)

ON THE CORRELATION OF WEATHER AND CROPS IN THE EAST OF SCOTLAND. Jour. Scot. Met. Soc. (3) 16: 184-187. 1912.

The author correlates the yield of oats and potatoes with the rainfall and temperature from 1886 to 1911.

WEATHER AND COTTON. U. S. Dept. Agr., Weather Bur. Natl. Weather and Crop Bul. (ser. 9, 1917) p. 3. May 15, 1917.

(2191)

"In general, the most favorable weather conditions for cotton are warm and comparatively dry weather during May and June and moderate rainfall during the succeeding three months. The most unfavorable are cool and wet weather during the former period and dry and hot during the latter."

WEATHER AND CROPS IN EUROPE IN 1904. Jour. Bd. Agr. [Gt. Brit.] (n. s.) 11: 479-485. Nov. 1904.

(2192)

Contains a description of the effects of the weather of 1904 on crops in a number of European countries. "The Central and South-Eastern countries of Europe suffered in a marked degree from drought and extreme heat, and the crops, particularly maize, roots, potatoes, late hay and fodder crops, have in consequence been more or less injured, though it is probable that in the case of the cereal crops there may be some compensation in the improved quality of the grain."

WEATHER AND THE YIELD OF CORN. U. S. Dept. Agr., Weather Bur. Natl. Weather and Crop Bul. (ser. 1916) no. 14, p. 2-3, 7. June 20, 1916.

(2193)

A diagram shows the relation between the rainfall for the month of July and the yield of corn over the States of Ohio, Indiana, Illinois, Iowa, Nebraska, Kansas, Missouri, and Kentucky for the 28 years from 1888 to 1915, inclusive.

WEATHER AND THE YIELD OF POTATOES. U. S. Dept. Agr., Weather Bur. Natl. Weather and Crop Bul. (ser. 1916) no. 19, p. 2-3, 7.

(2194)

"A study of the effect of temperature and rainfall upon the yield of potatoes in Ohio, Michigan, and New Jersey shows that the temperature of July is the most important weather factor in those states."

WEATHER AND THE YIELD OF WINTER WHEAT. U. S. Dept. Agr., Weather Bur. Natl. Weather and Crop Bul. (ser. 1917) no. 32, p. 3. 1917.

(2195)

A study is made of the relation of rainfall and temperature and yield of winter wheat in Kansas, Missouri, and Ohio.

- WEAVER, JOHN E. (2196)
 PLANT PRODUCTION AS A MEASURE OF ENVIRONMENT. A STUDY IN CROP ECOLOGY.
 Jour. Ecology 12: 205-237. July, 1924.
 The results are given of a study of the relation between habitat factors and plant response made at stations in Nebraska, Kansas, and eastern Colorado. "At each station . . . rainfall, water, and nutrient content of soil, humidity, evaporating power of the air, soil and air temperature, and wind movement were measured and compared during three growing seasons . . . It was early determined that the water relations of soil and air were controlling, other factors being merely contributory."
 — and HIMMEL, W. J. (2197)
 RELATION BETWEEN THE DEVELOPMENT OF ROOT SYSTEM AND SHOOT UNDER LONG-AND-SHORT-DAY ILLUMINATION. Plant Physiol. 4: 435-457. Oct., 1929.
 A study of the relative development of roots and tops of eight species of plants grown under 7-hour and 15-hour daily illumination.
 — and MOGENSEN, A. (2198)
 RELATIVE TRANSPIRATION OF CONIFEROUS AND BROAD-LEAVED TREES IN AUTUMN AND WINTER. Bot. Gaz. 68: 393-424. Dec., 1919.
 WEBBER, H. J., and others. (2199)
 A STUDY OF THE EFFECTS OF FREEZES ON CITRUS IN CALIFORNIA. p. 243-321
 Berkeley, 1919. (Calif. Agr. Expt. Sta. Bul. 304.)
 Contains articles on the freeze of 1913 in California, the changes that take place in frozen oranges and lemons, and orchard heating.
 WEDDERBURN, WILLIAM. (2200)
 DROUGHT-RESISTING FODDER PLANTS. Jour. Bombay Nat. Hist. Soc. 14: 614-620, Oct. 18, 1902; 15: 149-155, June 10, 1903.
 WEIMER, JAMES L. (2201)
 SOME FACTORS INVOLVED IN THE WINTERKILLING OF ALFALFA. Jour. Agr. Research 39: 263-283. Aug. 15, 1929.
 This is a discussion of the freezing point of alfalfa root tissue.
 — and HARTER, L. L. (2202)
 INFLUENCE OF TEMPERATURE ON THE PECTINASE PRODUCTION OF DIFFERENT SPECIES OF RHIZOPUS. Amer. Jour. Bot. 10: 127-132. Mar., 1923.
 By investigating the growth of various species of Rhizopus on the sweet potato, "the writers proposed to determine (1) if pectinase is produced at any temperature at which the fungus will grow, and (2) if the amount produced is greatest at the optimum temperature for infection and decay."
 — and HARTER, L. L. (2203)
 TEMPERATURE RELATIONS OF ELEVEN SPECIES OF RHIZOPUS. Jour. Agr. Research 24: 1-40. April 7, 1923.
 This paper presents the results of a study of the effect of temperature on the development of eleven species of Rhizopus.
 WEIR, JAMES R. (2204)
 NOTES ON THE ALTITUDINAL RANGE OF FOREST FUNGI. Mycologia 10: 4-14. Jan., 1918.
 The influence of temperature, precipitation, and altitude on forest fungi is briefly discussed.
 WEISS, JOHN E. (2205)
 EINFLUSS DER WITTERUNGSVERHÄLTNISSE AUF DAS AUFTRETEN VON PFLANZEN-KRANKHEITEN UND TIERISCHEN SCHÄDLINGEN 1916 UND 1917. Ztschr. Pflanzenkrankh. 28: 116-142, 201-210. 1918.
 It is shown that moisture is favorable to the outbreak of a number of plant diseases.
 WEISSE, ARTHUR. (2206)
 ÜBER ÄNDERUNG DER BLÜTENFARBE DURCH ÄUSSERE FAKTOREN. Verhandl. Bot. Ver. Brandenburg 65: 27-36. 1923.
 The effect of heat and light on the color of certain plants is discussed.
 WELDON, GEORGE P. (2207)
 PEACH WINTER INJURY IN SOUTHERN CALIFORNIA AND A POSSIBLE REMEDY. Calif. Cult. 66: 593. May 22, 1926.
 — (2208)
 WEATHER AND FUNGOUS DEVELOPMENT. Pacific Rural Press 113: 499. Apr. 9, 1927.

- WELLS, H. M. (2209)
TREATING WINTER INJURY OF APPLE TREES. p. 188-192. East Lansing, May, 1929. (Mich. Agr. Expt. Sta. Quart. Bul. 11.)
"The Golden Delicious is a variety that should be classed with those which are extremely subject to winter injury."
- WELTON, F. A., and MORRIS, V. H. (2210)
CLIMATE AND THE CLOVER CROP. Jour. Amer. Soc. Agron. 17: 790-800. Dec., 1925.
"The statistical data herein presented indicate that under Ohio conditions an increase in clover yields does, within limits, follow an increase in total rainfall for the months of April, May, and June; an increase in cloudiness for the months of April, May, and June; an increase in total snowfall; an increase in temperature for the months of March and April and a decrease in temperature for the months of May and June."
- and MORRIS, V. H. (2211)
WHEAT YIELD AND RAINFALL IN OHIO. Jour. Amer. Soc. Agron. 16: 731-749. Nov., 1924.
It is found that "in Ohio a decrease in rainfall is accompanied by an increase in yield of wheat. Subnormal rainfall is more beneficial in the autumn and early spring, than in the winter or late spring. November and April are the two individual months in which subnormal rainfall appears to be most beneficial. Wheat yields are probably depressed in most years by too much rainfall."
- WENHOLZ, H. (2212)
EFFECT OF FROST ON MAIZE. Agr. Gaz. N. S. Wales 30: 509-511. July 2, 1919.
"Late spring frosts do not affect some varieties of maize as badly as others, whereas the damage from early autumn frosts is the same with all varieties if they are caught at the same stage of immaturity."
- WENT, FRIEDRICH A. F. C. (2213)
PERIODISCHE ERSCHEINUNGEN BEIM BLÜHEN TROPISCHER GEWÄCHSE. Naturwissenschaften 5: 72-76. Feb. 2, 1917.
The author discusses the effect of temperature and moisture on the blooming period of tropical plants.
- WERNER, HARVEY O. (2214)
FURTHER REPORT ON ENVIRONMENTAL RELATIONS TO QUALITY IN SEED POTATOES. Potato Assoc. Amer. Ann. Meeting Proc. 13: 58-67. Dec., 1926.
This is a supplement to a paper read by the author before the potato association in 1925. "A thorough study of the literature fails to yield a single clear-cut instance wherein the productivity of seed potatoes was altered by environmental factors, when disease was not present."
- (2215)
RELATIONS OF ENVIRONMENTAL FACTORS TO PRODUCTIVENESS OF SEED POTATOES. Potato Assoc. Amer. Ann. Meeting Proc. 12: 10-12. 1925.
- WERTH, EMIL. (2216)
FLOREN-ELEMENTE UND TEMPERATURVERTEILUNG IN DEUTSCHLAND. Ber. Deut. Bot. Gesell. 45: 638-643. 1927.
A study of the flora of Germany as determined by temperature distribution.
- (2217)
FROSTSCHÄDEN AM OBST DURCH DEN MÄRZLICHEN WINTERRÜCKSCHLAG. Nachrbl. Deut. Pflanzenschutzdienst 5 (4): 25-26. Apr. 1, 1925.
Damage done to fruit by low temperatures in March after a mild January and February.
- (2218)
FROSTSCHÄDEN AN DEN OBSTBÄUMEN IN DAHLEM. Nachrbl. Deut. Pflanzenschutzdienst 9 (5): 38. May, 1929.
A note on frost damage to fruit trees in Dahlem.
- , MANSFELD, K., and MANSFELD, R. (2219)
UNTERSUCHUNGEN ÜBER DEN EINFLUSS DER WITTERUNG AUF DIE PHÄNOLOGIE VON APFELBAUM UND WINTERROGGEN. Mitt. Biol. Reichsanst. Land-u. Forstw. 25: 191-222. Dec., 1924.
A study is made and charts are given showing the relation between temperature and humidity and the growth of apples and winter rye.

- WEST, CYRIL. (2220)
 PLANT PHYSIOLOGY. Sci. Prog. in the Twentieth Century [London] 18:
 386-392. Jan., 1924.
 The author gives a brief summary of recently published works on "the
 behaviour of plants and plant tissues when exposed to frosts or low
 temperatures."
- WEST, E. R. (2221)
 INTERIM REPORT ON THE PROTECTION OF YOUNG CITRUS TREES FROM FROST.
 Jour. Dept. Agr. West. Aust. 7 (2): 141-145. Mar., 1930.
- WEST, FRANK L., and EDLEFSEN, N. E. (2222)
 FREEZING OF FRUIT BUDS. Jour. Agr. Research 20: 655-662. Jan. 15, 1921.
 "This paper gives the methods used and the results obtained from
 freezing more than 24,000 fruit buds, most of them being apples and
 peaches, and also the spring freezing temperatures and the yields of
 fruit in orchards near Logan, Utah, from 1913 to 1920."
 — and EDLEFSEN, N. E. (2223)
 THE FREEZING OF FRUIT BUDS. 24 p. Logan, 1917. (Utah. Agr. Expt. Sta.
 Bul. 151.)
 The effects of freezing on apples, peaches, cherries, and prunes are
 discussed.
- WHIPPLE, O. B. (2224)
 WINTER INJURY TO FRUIT BUDS OF THE APPLE AND PEAR. Amer. Soc. Hort.
 Sci. Proc. 1912: 143-148.
- (2225)
 WINTER INJURY TO FRUIT BUDS OF THE APPLE AND PEAR. p. 33-45. Bozeman,
 1912. (Mont. Agr. Expt. Sta. Bul. 91.)
 "Winter injury to fruit buds is not alone the result of low temperatures,
 but is more likely to occur when these low temperatures, or the thaw
 that follows, are accompanied by drying conditions, especially winds."
- WHITCOMB, WILLIAM O., and SHARP, P. F. (2226)
 GERMINATION OF FROZEN AND NONFROZEN WHEAT HARVESTED AT VARIOUS
 STAGES OF MATURITY. Jour. Agr. Research 31: 1179-1188. Dec. 15, 1925.
- WHITE, C. T. (2227)
 TWO NATIVE DROUGHT-RESISTANT FODDER PLANTS. Queensland Agr. Jour.
 13: 116-118. Mar., 1920.
- WHITE, ORLAND E. (2228)
 GEOGRAPHICAL DISTRIBUTION AND THE COLD-RESISTING CHARACTER OF CERTAIN
 HERBACEOUS PERENNIAL AND WOODY PLANT GROUPS. Brooklyn Bot. Gard.
 Rec. 15 (1): 1-10. Jan., 1926.
 It would seem that woody or perennial herbaceous plants must change
 their genetic composition in order to change their hardiness.
- (2229)
 MUTATION, ADAPTATION TO TEMPERATURE DIFFERENCES. AND GEOGRAPHICAL
 DISTRIBUTION IN PLANTS. Verhandl. Fifth Internatl. Conf. Genetics Bd. 2.
 p. 1575-1586. Berlin, 1927.
 A study of winter hardiness in plants.
- WHITE, R. P. (2230)
 WINTER INJURY—ITS CAUSE AND HOW TO PREVENT IT. N. J. Agr. 11 (11): 2-3.
 Nov., 1929.
 "Winter injury to evergreens is rarely caused directly by excessive
 cold during the winter. More damage is done during the winters when
 excessive fluctuations in temperature take place." The influence of wind
 is noted.
- WHITEHOUSE, W. E. (2230a)
 A STUDY OF VARIATION IN APPLES DURING THE GROWING SEASON. 13 p.
 Corvallis, Oreg., June, 1916. (Oreg. Agr. Expt. Sta. Bul. 134.)
 The results are given of a study made in the orchard of the Oregon
 Agricultural College during which records were kept of the temperature,
 rainfall, and approximate amount and intensity of sunshine throughout
 the growing period.
- WHITLEY, NICHOLAS. (2231)
 ON THE CLIMATE OF THE BRITISH ISLANDS IN ITS EFFECT ON CULTIVATION.
 Prize essay. Jour. Roy. Agr. Soc. 11: 1-63. 1850.
 The author discusses the effect of weather conditions on various crops,
 especially on wheat.

- WHITSON, A. R., and BAKER, O. E. (2232)
 THE CLIMATE OF WISCONSIN AND ITS RELATION TO AGRICULTURE. 65 p. Madison, 1912. (Wis. Agr. Expt. Sta. Bul. 223.)
 The relation of climate and the weather conditions that make up climate to corn, sugar beets, small grains, grasses, potatoes, peas, tobacco, fruit, and dairy products is discussed.
- WHITTEN, JOHN C. (2233)
 PREVENTING WINTER INJURY TO FRUIT. Minn. Hort. 46: 364-367. Oct., 1918. (2234)
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- DAS VERHÄLTNIS DER FARBE ZUR TÖTUNG VON PEIRSICHKNOSPEN DURCH WINTER FROST. 35 p. Halle a.S., Buchdruckerei des Waisenhauses, 1902.
 Some effects of winter frost on peach buds.
- WIBECK, EDVARD. (2235)
 DET NORRLÄNDSKA TALLFRÖETS GROBARHET. DIE KEIMFÄHIGKEIT DES NORRLÄNDISCHEN KIEFERNSAMENS. Meddel. Statens Skogsförsöksanst. [Sweden] 17: 1-20. 1920.
 Summary in German, p. 17-20.
 The results are given of a series of investigations on the influence of temperature on the germination of the seeds of *Pinus sylvestris* in northern Sweden.
- WICKS, W. H. (2236)
 BLOOMING PERIOD OF THE APPLE IN NORTHWEST ARKANSAS. Fayetteville, 1917. 12 p. (Ark. Agr. Expt. Sta. Bul. 134.)
 It is shown that the blooming period of the apple depends upon weather conditions from the preceding January.
- WICKSON, EDWARD J. (2237)
 THE CALIFORNIA FRUITS AND HOW TO GROW THEM. Ed. 8, 493 p. San Francisco, Pacific Rural Press, 1919.
 The function of high temperature, sunshine, and a low percentage of humidity on fruit production is discussed, p. 9-24.
- WICKWIRE, G. C., and others. (2238)
 COMPARATIVE EFFECT OF TEMPERATURE ON RATE OF PURE CHEMICAL REACTIONS AND RATE OF SUGAR UTILIZATION BY A PLANT AND A COLD-BLOODED ANIMAL. Bot. Gaz. 88: 430-436. Dec., 1929.
 "Raising and lowering the temperature produced an increase and decrease in sugar utilization by the plant *spirogyra*."
- WIESNER, J. (2239)
 DER LICHTGENUSS DER PFLANZEN. 322 p. Leipzig, Verlag v. W. Engelmann, 1907.
 The author discusses the effect of direct and diffused light on plant life.
- WIESNER, M. (2240)
 SUR L'ADAPTATION DE LA PLANTE À L'INTENSITÉ DE LA LUMIÈRE. Compt. Rend. Acad. Sci. [Paris] 138: 1346-1347. May 30, 1904.
 The author finds that the adaptation of a given plant to intensity of light is modified by climate, temperature, and by the diffused light in which most plants grow.
- WIESSMANN, H. (2241)
 EINFLUSS DES LICHTES AUF WACHSTUM UND NÄHRSTOFFAUFNAHME BEI VERSCHIEDENEN GETRIEDEGATTUNGEN. Landw. Jahrb. 56: 155-168. June, 1921.
 The effect of light on oats, summer rye, summer barley, and summer wheat is studied.
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- (2242)
 EINFLUSS DES LICHTES AUF WACHSTUM UND NÄHRSTOFFAUFNAHME BEIM HAFER. Landw. Jahrb. 53: 183-190. 1919.
 The influence of light on oats is discussed.
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- (2243)
 ÜBER DEN EINFLUSS DES LICHTES AUF DIE NÄHRSTOFFAUFNAHME DER PFLANZEN IM JUGENDSTADIUM. Ztschr. Pflanzenernähr. u. Düngung 4: 153-155. Apr., 1925.
 A brief discussion of the effect of light on food absorption of plants in the early stages of growth.
- WIGGANS, C. B. (2244)
 THE INFLUENCE OF CERTAIN ENVIRONMENTAL AND CULTURAL CONDITIONS ON FRUIT-BUD FORMATION OF PEAR AND APRICOT. Jour. Agr. Research 31: 865-883. Nov. 1, 1925.

WIGGANS, C. B.—Continued.

The results are given of a study of climatic conditions in the coastal valleys, interior valleys, and foothills of California on the time of differentiation and the rate of development of the fruit buds of the pear and apricot.

WIGGANS, CLEO, CLED C. (2245)

WINTER INJURY TO FRUIT TREES. Iowa State Hort. Soc. Rpt. 60: 63-71. 1925.

WILCOX, RAYMOND B. (2245a)

OBSERVATIONS ON MASKING OF RASPBERRY MOSAIC BY HIGH TEMPERATURE. (Abstract.) Phytopathology 16: 80. Jan., 1926.

Abstract of a paper presented at the seventeenth annual meeting of the American Phytopathological Society, Kansas City, Mo., Dec. 29-31, 1925.

WILEY, HARVEY W. (2246)

INFLUENCE OF ENVIRONMENT ON THE CHEMICAL COMPOSITION OF PLANTS. U. S. Dept. Agr. Yearbook 1901: 299-318. 1902.

Discusses the influence of rainfall, temperature, length of day, and sunshine on sugar beets.

(2247)

THE INFLUENCE OF SOIL AND CLIMATE UPON THE COMPOSITION OF THE SUGAR BEET, 1901. 42 p. Washington, D. C., 1903. (U. S. Dept. Agr. Bur. Chem. Bul. 74.)

Data obtained from a number of experiments made in 1901 indicate that the percentage of sunshine seems to have little effect upon the sugar content of the beet. As a general rule "the percentage of sugar in the beet increases with the length of the day . . . The tendency of the sugar is to diminish as the temperature increases . . . The actual amount of rainfall does not have so great an influence on the composition of the beet as does its distribution . . . It is important, however, that the rainfall be not too great in September, which is the period of ripening, nor in October, the season of harvesting."

WILLIAMS, C. B. (2248)

COTTON GROWING IN RELATION TO CLIMATE IN EGYPT AND THE SUDAN. Egypt Min. Agr., Tech. and Sci. Serv. Bul. 47, 31 p. 1924.

The author considers the effect of temperature, moisture, wind, and light on cotton growing in Egypt and the Sudan.

(2249)

THE COTTON PLANT IN RELATION TO TEMPERATURE AND RAINFALL. Egypt Min. Agr., Tech. and Sci. Serv. Bul. 32, 5 p. 1923.

Establishes a relation between temperature and rainfall and cotton growing in different countries.

(2250)

RAINFALL, SUGAR PRODUCTION, AND FROGHOPPER BLIGHT IN TRINIDAD. Trinidad and Tobago. Dept. Agr. Bul. 18 (pt. 3): 153-167. 1919.

"Alternation of wet and dry periods during the growth of the sugar cane is shown to be an important factor in determining the prevalence of 'blight.' A long dry season, followed by unusually heavy rains in June or July, is frequently connected with widespread blight. The most important climatic condition appears to be the severity of the 'Indian Summer,' a dry period in September or October."

WILLIAMS, W. R. LLOYD. (2251)

FROST-PREVENTION FOR ORCHARDS. New Zealand Jour. Agr. 36: 382-401; 37: 19-29, 106-117. 1928.

Meteorological factors influencing the occurrence of frost, injurious temperatures, and frequency and severity of frosts are among the subjects discussed.

(2252)

FROST-PREVENTION FOR ORCHARDS. EXPERIMENTS AND EXPERIENCES IN CENTRAL OTAGO. SEASON 1928-29. New Zealand Jour. Agr. 39: 155-160. Sept. 20, 1929.

Protection of fruit trees and tomatoes against frost is discussed.

WILSON, BARKER D. (2253)

THE CONNECTION OF METEOROLOGY WITH OTHER SCIENCES. Quart. Jour. Roy. Met. Soc. [London] 31: 85-95. Apr., 1905.

WILSON, BARKER D.—Continued.

The author suggests that, as "agriculturists are more dependent on the weather and more interested in the development of its study than any other class of persons . . . cooperation between agriculturists and meteorologists over large areas would appear to be the most promising system of work."

WILSON, BYRON H. (2254)

THE RELATION OF HARDINESS AND MATURITY IN THE APPLE. Amer. Soc. Hort. Sci. Proc. 26: 199–202. Des Moines, Iowa, Dec. 30, 1929–Jan. 1, 1930.

"In general, the results [of experiments] indicate a relationship between the amount of winter injury and the time when leaves are dropped. If life processes are interrupted by cold weather early in the autumn before late maturing varieties have dropped their leaves, the per cent of leaves persisting will give a good indication of the amount of winter injury, but if weather conditions are so favorable that all varieties are able to mature and drop their leaves before cold weather commences, then at no time in the autumn will leaf fall show any marked relationship to winter injury."

(2255)

THE RELATION OF MATURITY IN THE APPLE TO RELATIVE WINTER INJURY. Sci. Agr. 10: 598–606. May, 1930.

WILSON, E. H. (2256)

THE HARDINESS OF PLANTS FROM CENTRAL AND WESTERN CHINA. Gard. Chron. (3) 66: 143. Sept. 13, 1919.

WILSON, EDWARD E. (2257)

STUDIES OF THE ASCIGEROUS STAGE OF VENTURIA INAEQUALIS (CKE.) WINT. IN RELATION TO CERTAIN FACTORS OF THE ENVIRONMENT. Phytopathology 18: 375–418. May, 1928.

Some effects of weather conditions on apple scab are indicated.

WILSON, GUY W. (2258)

NOTES ON PERONOSPORALES FOR 1907. Iowa Acad. Sci. Proc. 15: 85–89. 1908.

The appearance and development of these fungi are correlated with weather conditions.

WILSON, H. J. (2259)

WHEAT, SOYBEAN, AND OAT GERMINATION STUDIES, WITH PARTICULAR REFERENCE TO TEMPERATURE RELATIONSHIPS. Jour. Amer. Soc. Agron. 20: 599–619. June, 1928.

"The present investigation was planned to determine the optimum temperature requirements for the germination of wheat (*Triticum vulgare*), soybeans (*Soja max*), and oats (*Avena sativa*). As the experiments were limited to the temperature aspect, it is believed that the studies have progressed far enough to warrant conclusions contributing to a better understanding of germinative* phenomena in relation to temperature."

WILSON, HAROLD K., and HOTTES, CHARLES F. (2260)

WHEAT GERMINATION STUDIES, WITH PARTICULAR REFERENCE TO TEMPERATURE AND MOISTURE RELATIONSHIP. Jour. Amer. Soc. Agron. 19: 181–190. Feb., 1927.

"Moisture as well as temperature is essential for germination."

WILSON, WILFORD M. (2261)

FROSTS IN NEW YORK. p. 505–543. Ithaca, 1912. (N. Y. Cornell Agr. Expt. Sta. Bul. 316.)

Some effects of frost on crops in New York are discussed and antidotes suggested

WINBERG, O. F. E., and others. (2262)

REPORT ON FREEZE INJURY TO CITRUS TREES FOR 1916 AND 1917, WITH NOTES ON ORANGE CULTURE IN SOUTH ALABAMA. 26 p. Auburn, 1918. (Ala. Agr. Expt. Sta. Bul. 199.)

WINKLER, ALBERT. (2263)

ÜBER DEN EINFLUSS DER AUSSENBEDINGUNGEN AUF DIE KÄLTERESISTENZ AUSSAUERENDER GEWÄCHSE. Jahrb. Wiss. Bot. 52: 467–508. 1913.

The cold resistance of trees is studied.

WINSLOW, R. M. (2264)

THE RELATION OF CLIMATE TO VARIETIES OF APPLES. Amer. Soc. Hort. Sci. Proc. 1914: 137–148.

WINSLOW, R. M.—Continued.

"The determination of the length of the growing season, the total heat units, and the hottest six weeks" are of great assistance in determining the choice of crops.

WINTER COLD AND SUMMER GROWTH. Gard. Chron. (3) 69 (1781): 73. Feb. 12, 1921. (2265)

Criticism of Coville's paper, The Influence of Cold in Stimulating the Growth of Plants, published in Jour. Agr. Research v. 22. Oct., 1920.

WINTER INJURY AND BACTERIAL WILT OF ALFALFA. Through the Leaves 16: 427-434. Oct., 1928. (2266)

WINTER INJURY AND SUN SCALD. Tree Talk 7 (2): 29. Winter number 1926. (2267)

WINTER INJURY TO PEACH AND APPLE TREES. U. S. Dept. Agr., Bur. Plant Indus. Plant Disease Rptr. 14 (6): 44-52. Mar. 15, 1930. [Mimeographed.] (2268)

Winter injury to peach and apple trees in several States is described.

WISHART, J., and MACKENZIE, W. A. (2269)

STUDIES IN CROP VARIATION. VII. THE INFLUENCE OF RAINFALL ON THE YIELD OF BARLEY AT ROTHAMSTED. Jour. Agr. Sci. [England] 20: 417-439. July, 1930. (2270)

WITTE, HERNFRID. (2270)

RÖDKLÖVERNS AVKASTNING PÅ SVALÖF UNDER ÅREN 1908-1921 OCH NEDERBÖRDENS INVERKAN PÅ SKÖRDENTBYTTET UNDER OLIKA ÅR. Sveriges Utsädesför. Tidskr. 33: 169-182. 1923. (2271)

The author studies the effect of rainfall on the yield of Swedish clover and of red Silesian clover at Svalöf during the period from 1908 to 1921.

(2271)

DE VIKTIGASTE VALLGRÄSENS AFKASTNING I FÖRSÖK PÅ SVALÖF ÅREN 1910-1921 SAMT NEDERBÖRDENS INFLYTANDE PÅ CLIKA ÅRS SKÖRDELSULTAT. Sveriges Utsädesför. Tidskr. 32: 21-47. 1922. (2272)

Abstract in Internatl. Rev. Sci. and Pract. Agr. [Rome] 13: 633-637. May-June, 1922.

"This article gives the results of an investigation of the relation between rainfall and the hay crop . . . The author has ascertained that the most beneficial rains are those which fall from the 16th of April until the first cutting. The length of this period varies according to the temperature conditions and the particular species of grass."

WLODEK, JEAN. (2272)

RECHERCHES SUR L'INFLUENCE DE LA LUMIÈRE ET DES ENGRAIS CHIMIQUES SUR LE COEFFICIENT CHLOROPHYLLIEN. 190 p. Chacovie, Impr. Univ., 1922. (2273)

Reprint from Bul. Acad. Polon. Sci. et Lettres, Cl. Sci. Math. et Nat. Sér. B, Sci. Nat. Jan.-Dec., 1921.

The effect of light on the chlorophyll coefficient of leaves.

WOCKE, ERICH. (2273)

BEOBACHTUNGEN UND GEDANKEN ÜBER FROSTSCHÄDEN IN WESTPREUSSEN IM WINTER 1916/17. Mitt. Deut. Dendrol. Gesell. no. 28, p.207-212. 1919. (2274)

An account of frost injury to trees in West Prussia during the winter of 1916-17.

WOLFE, T. K. (2274)

A MATHEMATICAL INQUIRY INTO THE INFLUENCE OF THE AMOUNT AND DISTRIBUTION OF RAINFALL ON THE YIELD OF CORN. Jour. Amer. Soc. Agron. 17: 356-362. June, 1925. (2275)

Experiments made at Blacksburg, Va., show that "if the entire corn year is considered, an increase in rainfall, within limits, is accompanied by an increase in yield of corn . . . Alternate wet and dry periods are very favorable to corn production. It seems that a low rainfall in May and July accompanied by a high rainfall in June and August is conducive to a high yield of corn. Ample rainfall before earing time, in June, is very beneficial to corn production as is abundant rainfall during earing time, in August."

WOLK, P. C. VAN DER. (2275)

INVESTIGATION OF THE TRANSMISSION OF LIGHT STIMULA IN THE SEEDLINGS OF AVENA. K. Akad. Wetensch. Amsterdam, Proc. Sect. Sci. 14: 327-342. Oct. 28, 1911.

- WOLLABER, A. B. (2276)
THE SEVERE COLD OF DECEMBER 25-26, 1911, IN THE CITRUS DISTRICTS OF SOUTHERN CALIFORNIA, AND METHODS ADOPTED FOR FRUIT PROTECTION. U. S. Mo. Weather Rev. 40: 443-446. March, 1912.
- WOOD, A. G. (2277)
EFFECT OF SUNSHINE AND SHAPE OF FRUIT ON THE RATE OF RIPENING OF TOMATO FRUITS. *Plant Physiol.* 3: 513-517. 1928.
Not seen.
Abstract in Expt. Sta. Rec. 60: 439. Apr., 1929.
"Studies at the Indiana Experiment Station indicated a high positive correlation between the number of sunshine hours and the number of days required for tomatoes to ripen after they had started to color."
- WOOD, JOSEPH G. (2278)
ON TRANSPIRATION IN THE FIELD OF SOME PLANTS FROM THE ARID PORTIONS OF SOUTH AUSTRALIA WITH NOTES ON THEIR PHYSIOLOGICAL ANATOMY. *Roy. Soc. So. Aust. Trans. and Proc.* 47: 259-278. 1923.
"The transpiration rates of six species of plants are measured and discussed in relation to temperature, light intensity, relative humidity, and evaporating power of the air." (2279)
PHYSIOLOGICAL DERANGEMENTS IN VINES SUBSEQUENT TO INJURY BY COLD. *Aust. Jour. Expt. Biol. and Med. Sci.* 6 (pt. 2): 103-106. June 16, 1929.
"The object of this paper is to place on record the nature of the pathological symptoms caused in currant and sultana vines by the 'Black Frost' in the irrigation areas in the Murray Valley in September, 1927. The injury was of a twofold nature: First, the destruction of the living tissues of the shoots immediately following the frost, and, secondly, the subsequent falling of the flowers produced from dormant buds." (2280)
THE RELATIONS BETWEEN DISTRIBUTION, STRUCTURE, AND TRANSPIRATION OF ARID SOUTH AUSTRALIAN PLANTS. *Roy. Soc. So. Aust. Trans. and Proc.* 48: 226-235. 1924.
"Transpiration studies . . . when taken in conjunction with the soil-water relations of the plant, give a very valuable insight into the determination of the distribution and of the habitats of desert plants." (2281)
WOODCOCK, EDWARD F. (2281)
OBSERVATIONS ON THE POTATO DISEASE CONDITIONS IN MICHIGAN FOR THE SUMMER OF 1918. *Mich. Acad. Sci. Ann. Rpt.* 21: 281-285. 1919.
"Although the above observations do not in all cases show a correlation between weather and the prevalence of the disease . . . there were some quite evident correlations observed." (2282)
WOODMAN, HERBERT E., BLUNT, DENZIL L., and STEWART, JAMES. (2282)
NUTRITIVE VALUE OF PASTURE. *Jour. Agr. Sci. [England]* 16: 205-274. Apr., 1926.
"The influence of meteorological factors on the seasonal yield has been discussed in detail . . . There was a distinct correlation between rainfall and yield during the dry mid-season, the productivity of the pasture increasing or declining in the week following a rise or fall in the amount of rainfall." (2283)
WOODROOF, J. G. (2283)
DRY WEATHER AND THE FOREST TREES. *Farming* 23: 223-224. Nov., 1925. (2284)
STUDIES OF THE STAMINATE INFLORESCENCE AND POLLEN OF HICORIA PECAN. *Jour. Agr. Research* 40: 1059-1104. June 15, 1930.
It is found that "pollen sheds only when the relative humidity of the air is below 85 per cent and that practically all shedding occurs between 9 a. m. and sundown . . . Optimum conditions for the shedding of pollen are those which exist in the orchard on a warm sunny day, and optimum conditions for germination are found in an orchard on a warm, dewy night." (2285)
WOODWARD, K. W. (2285)
TREE GROWTH AND CLIMATE IN THE UNITED STATES. *Jour. Forestry* 15: 521-531. May, 1917.
"The purpose of this paper is to summarize the available information with regard to forest yields in the United States and attempt to determine the relation of these yields to climate and soil."

- WREN, H. B. (2286)
CLIMATE AND CORN. U. S. Mo. Weather Rev. 29: 8-14. Jan., 1901.
Contains a brief "analytical survey of the separate factors that constitute climate and their individual effects on the plant and on seed."
- WRIGHT, R. C., and HARVEY, R. B. (2287)
THE FREEZING POINT OF POTATOES AS DETERMINED BY THE THERMOELECTRIC METHOD. 7 p. Washington, D. C., 1921. (U. S. Dept. Agr. Bul. 895.)
"The freezing point tends to rise as the season advances . . . [and] seems to vary with the variety."
- and TAYLOR, GEORGE F. (2288)
FREEZING INJURY TO POTATOES WHEN UNDERCOOLED. 15 p. Washington, D. C. 1921. (U. S. Dept. Agr. Bul. 916.)
"Potatoes freeze more quickly when exposed to a rapidly diminishing temperature than when the temperature diminishes slowly."
- and TAYLOR, GEORGE F. (2289)
THE FREEZING TEMPERATURES OF SOME FRUITS, VEGETABLES, AND CUT FLOWERS. 8 p. Washington, D. C., 1923. (U. S. Dept. Agr. Bul. 1133.)
Freezing-point determinations are made for a large number of fruits and vegetables.
- WURMSER, RENÉ (2290)
L'ACTION DE LA LUMIÈRE SUR LA CHLOROPHYLLE COLLOÏDALE EN PRÉSENCE DE STABILISATEURS. Compt. Rend. Soc. Biol. [Paris] 83: 437-438. Mar. 27, 1920.
The effect of light on chlorophyll is discussed.
- WYLIE, CHARLES CLAYTON. (2291)
THE SOLAR CYCLE IN TEMPERATURE AND IN CROPS. Pop. Astron. 35: 253-256. May, 1927.
Curves are given showing the relation between the solar cycle of 11 years and temperature and the yield of corn, wheat, and oats in certain parts of the United States over a period of years.
- XARISOMENOV, C. (2292)
THE INFLUENCE OF RAIN AND OF ATMOSPHERIC TEMPERATURE ON THE CEREAL CROPS IN THE GOVERNMENTS OF SARATOV, SAMARA, AND TAMBOV. Internatl. Inst. Agr. [Rome], Bur. Agr. Intell. and Plant Diseases Bul. 3: 609-610. March, 1912. See also item 590.
An abstract of a Russian article, published in the Rev. Expt. Agr. G. 12, p. 927-928, which shows the effect of rainfall and of temperature on the cultivation of cereals, forage plants, and potatoes.
- XAVIER, RAUL. (2293)
A PRIMEIRA EXPERIENCIA DA ESTAÇÃO METEORO-AGRARIA DE S. SIMÃO (S. PAULO)—MILHO "CHAMPAGNE." Rev. Mens. Met. [Brazil] 1 (3-5): 25-30. June-Aug., 1922.
Abstract in Internatl. Rev. Sci. and Pract. Agr. [Rome] (n. s.) 1 (1): 78-80. Jan.-Mar., 1923.
"The author gives an account of results obtained in a series of investigations . . . with reference to the effect of climatic conditions on development and productivity of the 'Champagne' maize variety."
- YASUDA, SADAÔ. (2294)
ON THE RESISTANCE OF BARLEY TO WINTER COLD. I. ON THE RELATION BETWEEN THE RESISTANCE TO WINTER COLD AND THE MONOSACCHAROSE CONTENT. Jour. Sci. Agr. Soc. Tokyo no. 288, p. 486-492. Nov., 1926.
Not seen.
- YOSHII, YOSHIIJI. (2295)
SOME PRELIMINARY STUDIES OF THE INFLUENCE UPON PLANTS OF THE RELATIVE LENGTH OF DAY AND NIGHT. Tôhoku Imp. Univ. Sci. Rpts. (4) 2: 143-157. Nov., 1926.
Experiments made with wheat, Indian millet, buckwheat, sunflower, cosmos, morning-glory, eggplant, soybean, and rice are described. "Most of the test plants belong to the short-day plants and they come into flower only when the length of the day falls within certain limits. There is, however, another group of plants which are nearly or entirely indifferent to photoperiod, but are affected for the time of flowering by other factors. The rate of growth is proportional to the length of daily exposure to light. The growth of a plant is also forced by slight shading but in this case the plant generally produces flowers sparingly. The early and the late varieties of rice respond to light regulation quite

YOSHII, YOSHII—Continued.

differently not only in the time of flowering, but also in the rate of growth; the late variety is a short-day plant, while the early variety is indifferent to the regulation of the light period. Photoperiodism is a critical factor for the distinction of the varieties of a certain plant, and most interesting and important results may be obtained by studying the photoperiodism of varieties of various useful plants."

(2296)

UNTERSUCHUNGEN ÜBER DIE TEMPERATURABHÄNGIGKEIT DER KOHLENSÄURE-ASSIMILATION BEI BOHNEN. *Planta Arch. Wiss. Bot.* 5: 681-695. June 23, 1928.

A study of the dependence on temperature of carbonic acid assimilation in beans.

YOTHERS, WILLIAM W.

(2297)

THE BLOOMING PERIOD OF CITRUS TREES IN FLORIDA. *Citrus Leaf* no. 62, p. 2-3, 5. Feb., 1926.

YOUNG, FLOYD D.

(2298)

COVER CROPS AND CITRUS ORCHARD TEMPERATURES. *Calif. Citrogr.* 11: 2, 16-17. Nov., 1925.

The author finds that cover crops increase the frost hazard, but only to a very limited extent.

(2298a)

DESERT WINDS AND WINDBREAK PROTECTION. *Calif. Citrogr.* 11: 455, 484-486. 1926.

(2299)

FROST AND THE PREVENTION OF FROST DAMAGE. 62 p. Washington, D. C. Apr., 1929 (U. S. Dept. Agr. Farmers' Bul. 1588).

(2300)

FROST PROTECTION BY ARTIFICIAL MIXING OF AIR. *Calif. Citrogr.* 9: 125, 132, 136, 138. Feb., 1924.

(2300a)

FROST PROTECTION FOR WALNUT GROVES. *Diamond Walnut News* 12 (1): 4-5. Feb., 1930.

"Timely observations on frost in relation to the sensitive walnut."

(2301)

A FURTHER STUDY OF THE RELATION BETWEEN COVER CROPS AND ORCHARD TEMPERATURES. *U. S. Mo. Weather Rev.* 53: 387-391. Sept., 1925.

It is found that cover crops increase the frost hazard, but only to a slight extent. The cover crop acts as a windbreak and prevents the cold air from mixing with the warmer air above.

(2302)

INFLUENCE OF COVER CROPS ON ORCHARD TEMPERATURES. *U. S. Mo. Weather Rev.* 50: 521-526. Oct., 1922.

(2303)

PROTECTING CITRUS ORCHARDS AGAINST FREEZING DAMAGES. *Calif. Citrogr.* 9: 96, 98. Jan., 1924.

(2304)

RATE OF INCREASE IN TEMPERATURE WITH ALTITUDE DURING FROSTY NIGHTS IN ORANGE GROVES IN SOUTHERN CALIFORNIA. *Calif. Citrogr.* 5: 136, 160-161. Mar., 1920.

(2305)

SUBSTITUTION OF FRUIT TEMPERATURES FOR AIR TEMPERATURES IN REGULATING ORCHARD HEATING FOR ORANGES. *U. S. Mo. Weather Rev.* 52: 381-387. Aug., 1924.

Figures given "present an interesting picture of the relationship between the temperatures in the orchard and those inside the fruit on the particular frosty nights on which the records were made."

(2306)

WEATHER FORECASTS IN RELATION TO THE MARKETING OF CITRUS FRUITS. *U. S. Mo. Weather Rev.* 57: 425. Oct., 1929.

A plea for aid for the farmer in meeting marketing problems caused by weather conditions.

—and CATE, CLAUDE C.

(2307)

DAMAGING TEMPERATURES AND ORCHARD HEATING IN THE ROGUE RIVER VALLEY, OREGON. *U. S. Mo. Weather Rev.* 51: 617-639. Dec., 1923.

Contains the results of an investigation into the damage done to pears by low temperatures.

- YOUNG, H. D. (2308)
THE COMPOSITION OF FROZEN ORANGES AND LEMONS. Jour. Indus. and Engin. Chem. 7: 1038-1041. Dec., 1915.
"The principal change caused in citrus fruits by freezing is an excessive loss of moisture. This is shown by a marked lowering of specific gravity. The percentages of sugar and acid decrease slightly but definitely. Since the change in the composition of the juice is slight, its edible qualities are not impaired if it is not frozen so severely as to cause it to dry up."
- YOUNG, W. J. (2308a)
A STUDY OF VARIATION IN THE APPLE. Amer. Nat. 48: 595-634. Oct., 1914.
Among the environmental factors studied which affect variation in the apple are moisture, temperature, latitude, altitude, light, and atmospheric pressure.
- YOUNGMAN, W. (2309)
THE INFLUENCE OF ATMOSPHERIC CONDITIONS UPON THE GERMINATION OF INDIAN BARLEY. India Dept. Agr. Mem., Bot. Ser. 11: 145-151. Oct., 1921.
- MUSINGS IN A MONSOON CLIMATE. Emp. Cotton Growing Rev. 6: 35-43. Jan., 1929. (2310)
The influence of the monsoon rainfall in agricultural practice in Central India is discussed. A table shows the rainfall and the yield of seed cotton on the government farm, Akola, Berar, from 1908-9 to 1927-28.
- ZACHAROWA, T. M. (2311)
ÜBER DEN EINFLUSS NIEDRIGER TEMPERATUREN AUF DIE PFLANZEN. Jahrb. Wiss. Bot. 65: 61-87. 1925.
The author discusses the effect of low temperature on the roots of grain crops.
- ZAITZEV, G. S. (2312)
THE EFFECT OF TEMPERATURE ON THE DEVELOPMENT OF THE COTTON PLANT. Trudy Selsk. Sta. (Turkestan Plant Breeding Sta., Trans. no. 7, 76 p. 1927.)
In Russian. English abstract, p. 73-75.
Abstract in Expt. Sta. Rec. 63: 20. July, 1930.
"Temperature, the most important factor contributing to determine the rapidity of the course of development of the cotton plant, affects the more important phases, as germination, appearance of the first leaf and buds, blooming and dehiscence, and also the less important intermediate phases, which determine the alternation of leaves, buds, flowers, and opened bolls."
- ZALENSKIĬ, R. G. (2313)
INFLUENCE OF THE PRINCIPAL METEOROLOGICAL FACTORS ON WINTER RYE. Trudy Selsk. Khoz. Met., no. 14, p. 48-63. 1915.
In Russian. Not examined. Reference given as found.
Abstract in Expt. Sta. Rec. 24: 715. June, 1916.
"The results of seven years' observations at the Bogoroditsky Agricultural College on the influence of precipitation and temperature on the growth and yield of winter rye are summarized. The general conclusion is that the best distribution of spring and summer precipitation and of temperature is as follows: Abundant precipitation and heat before the formation of heads; cool and damp weather during the formation of heads; dry and moderate temperature during the time of blooming; and moist and warm weather during the ripening period."
- ZALESKI, EDMOND. (2314)
LES CARACTÈRES DE RÉSISTANCE À LA GELÉE CHEZ LE BLÉ. Compt. Rend. Acad. Agr. France 15: 566-569. May 1, 1929.
Cold resistance of wheat is briefly discussed.
- ZALESKI, W. (2315)
ÜBER DIE ROLLE DES LICHTES BEI DER EIWESSEBILDUNG IN DEN PFLANZEN. Ber. Deut. Bot. Gesell. 27: 56-62. 1909.
The author discusses the influence of light on the formation of protein in plants.

ZALESKI, W.—Continued.

(2316)

ZUR KENNTNIS DER STOFFWECHSELPROZESSE IN REIFENDEN SAMEN. ERSTE MITTEILUNG ÜBER DEN UMSATZ DER STICKSTOFFVERBINDUNGEN. Bot. Centbl. Beihefte (1) 27: 63–82. 1911.

Abstract in Expt. Sta. Rec. 25: 431. Oct., 1911.

"The results are given of investigations on the metabolic changes that occur during the ripening process of seeds as influenced by light, dampness, oxygen, and temperature conditions, especially with reference to the nitrogenous compounds formed in the seeds."

ZILLICH, RUDOLF.

(2317)

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